THE REFINER AND NATURAL GASOLINE MANUFACTURER

In This Issue

Refining Progress Belies Waste Charge. Oil Board Should Study method of operation.

Building With an Eye for Tearing Down. Salvage is feature of Oklahoma plant.

How Stabilizer effects Large Saving. Flow sheet gives record on use of apparatus.

Technical Subjects will have place on Refiners Program at Kansas City meet.

Organizing and Maintaining a Fire Department.

Vol. 4 No. 2 FEBRUARY, 1925 $1.00 Per Year

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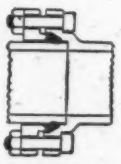

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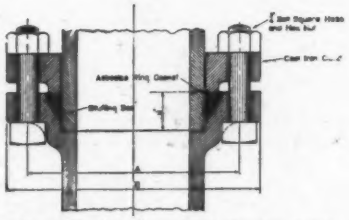

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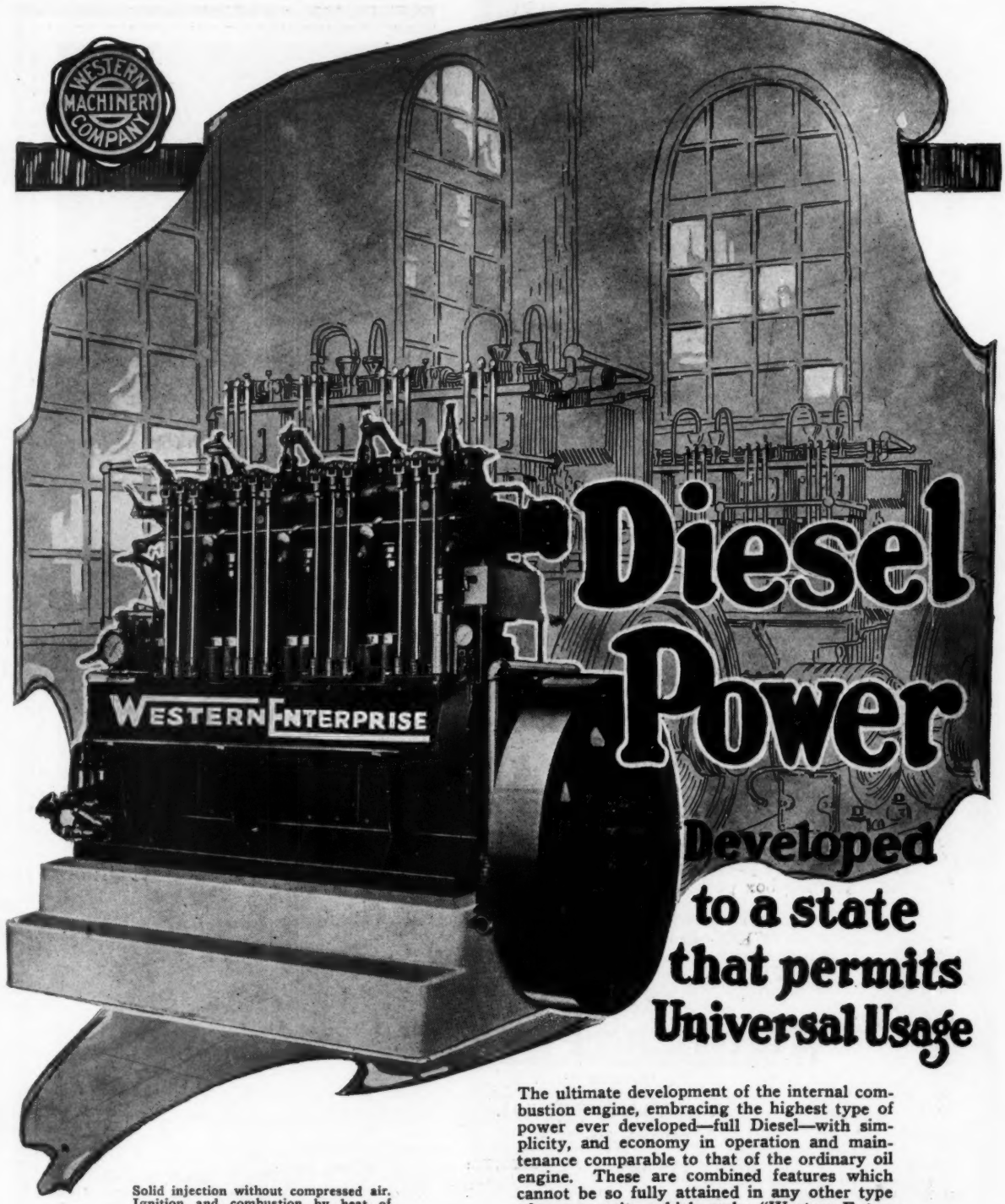

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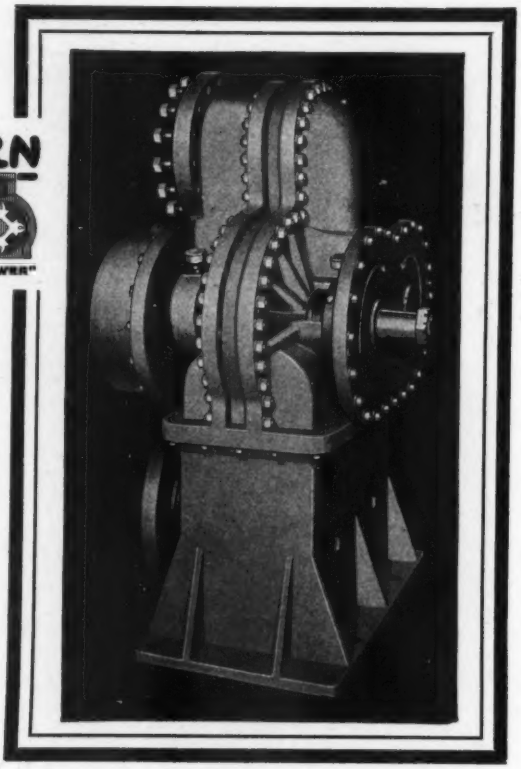

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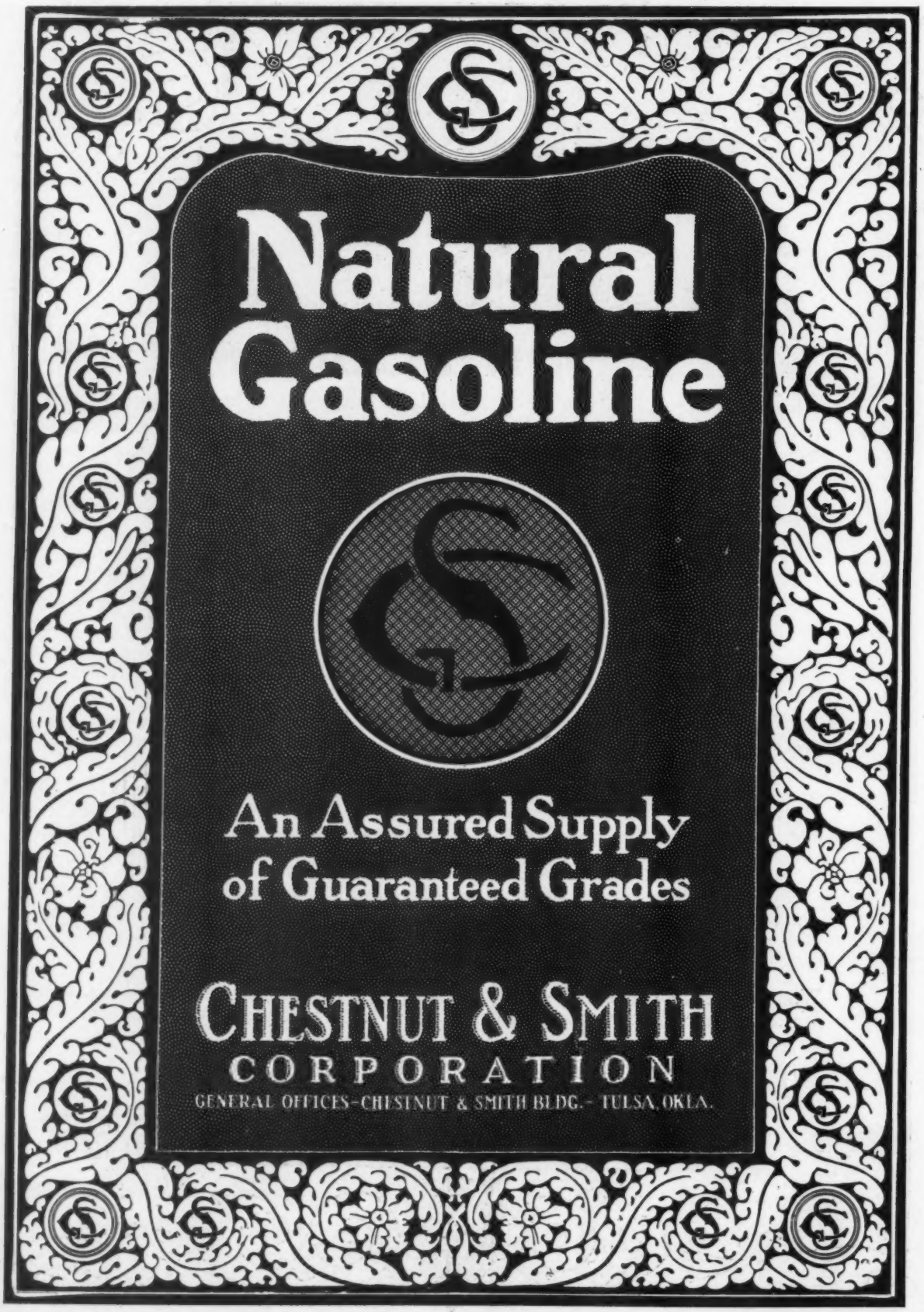
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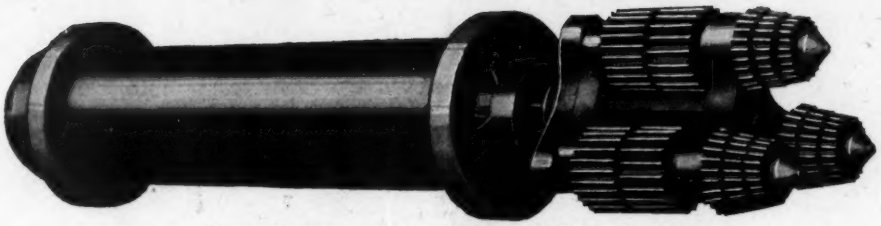

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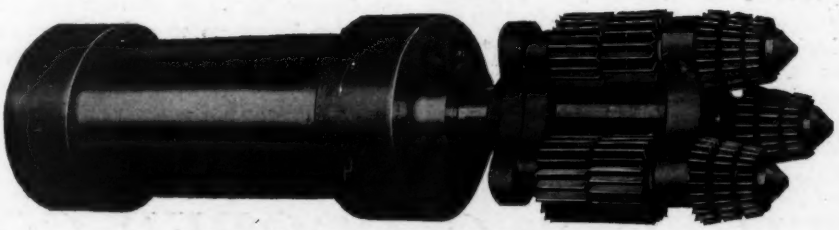

Liberty Victor Cleaner with Type "SF" No-rivet Head.

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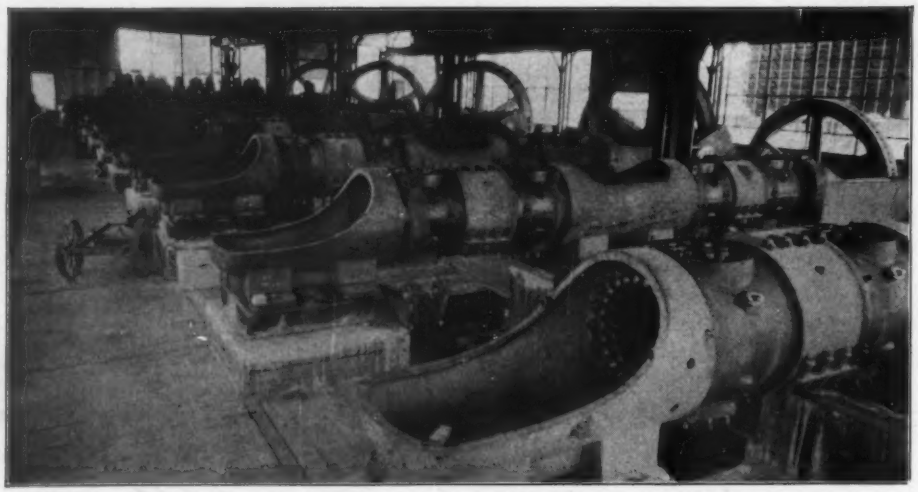

Magnolia's 85th Carload Shipped in December

"We are going to give you the contract for the gas engines and compressors for both stations, Mr. Thomas, with the understanding that everything be shipped by December 1st."

Fred Thomas, Vice President of The C. & G. Cooper Company, walked out of the Magnolia Building in Dallas that morning late last April fearing that he had pledged almost the impossible. Not that twenty 485 H.P. gas engines with compressors and four 90 H.P. auxiliary engines would tax Cooper production facilities or that seven months was too short a delivery promise. But Mr. Thomas remembered that his company was already pledged to deliver seventeen of the same size units in addition to a number of the 160 H.P. size before the Magnolia order could be started.

No ordinary organization of the size of The C. & G. Cooper Company could have met the demand. The very fact that the 83rd carload, completing everything except the last 10 compressor cylinders, left the Cooper plant on November 28th and the compressors were completed by December 6th—just six days late—emphasizes the fact that individual workmen in the Cooper Shops do share the responsibility of living up to a Cooper promise. It is this same individual interest that accounts for the qualities Cooper customers expect and get in Cooper gas engines and compressors.

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Refining Progress Belies Waste Charge

Oil Board can learn which way the petroleum industry is headed by studying refining methods

By Grady Triplett
Staff Representative

SOMEWHERE in the course of its activities the Federal Oil Conservation Board will turn attention to the refining division of the oil industry.

So far the questionnaires to come from Washington have held to oil production and imports. In fact, the letter of President Coolidge, creating the board, was a message on "waste and overproduction," with the oil field the sinner needing conversion.

But one word of that pair, "waste," can settle down over the refining division of the industry and bring enough gloom to make some of the depressions of the past few years appear like October sunsets.

Up to Refining

Until the board issues the questionnaire that will touch on refining, nothing can be known of the scope it will cover.

Within the industry, it is recognized that the greatest opportunity for conservation exists in refining. By this, it is not implied that refining methods are wasteful. But the greatest strides in true conservation, so far as the petroleum industry is concerned, belong to refining.

This was touched on by Amos L. Beaty, president of The Texas Company, in a recent address before the New York Bond Club, when he said:

"It seems to me that the greatest encouragement we have and one of the things that will appeal to those on the government board who study the question, and those in the industry who have studied it, is a kind of conservation that has been little talked of, and perhaps some of you have little thought of. We usually think of conservation as a setting aside of land. One thought is the creation of government reserves, and in passing I will say that that does not mean naval reserves.

"The real conservation that is going on is the higher uses of the product; the improvements in the processes. Take, for instance, this matter of gasoline. In the last five years the processes of manufacture have developed to such a point that out of the same quantity of crude, we get 25 to 30 per cent more gasoline than we could have gotten five years ago."

True Economy

It is true economy to take a tree, a rock or a barrel of coal and make it serve human beings more extensively than it did by older and less thorough processes That the petroleum industry, especially in refining, is accomplishing true economy is evident from the higher yield of gasoline as pointed out by Mr. Beaty.

That the chemist and the engineer have much more to accomplish along this line is undoubted. Another five years may see the recovery of gasoline increased another 25 per cent.

But this brings the situation face to face with a possibility that is not pleasant. The Federal Oil Conservation Board had started its work as a still hunt for evidence of "waste."

If a process exists by which the gasoline recovery from crude oil can be increased 25 per cent, the man not using such a process is a waster. That is true from the definition of the word. He is offering in his fuel oil what could be converted into gasoline.

By that standard, then, the skimming plant comes under the head of a waster. It can not recover gasoline to the extent that a plant with a cracking process can.

What Is Waste?

Or the refiner who takes crude oil of excellent lubricating content, removes the lighter fractions and sells his residue as fuel oil is a waster. For lack of sufficient equipment, this man is not turning his crude oil into the finished products possible from it.

The natural gasoline plant, which can extract two gallons of liquid from 1000 feet of gas, is a waster, if equipment exists by which more than two gallons of liquid can be extracted from that amount of the gas.

These are strict interpretations of waste. Perhaps the men on the Federal Oil Conservation Board have no thought of issuing an edict that will bring shut down to skimming plants and natural gasoline plants with old equipment. There is nothing to indicate that any legislation or any edict ever will result from the inquiry being conducted by the board. In Washington it is considered a long jump and a far call from the naming of a commission by the president to the enactment of legislation on its findings

Some Disagree

But it is evident that findings and possible legislation can bring a serious condition before the refining industry, especially before those who are compelled to operate small plants. Should efficiency and the removal of wasteful practices be entrusted to a set of appointed officials, it is not difficult to picture what would happen in the case of the man not able to show a plant functioning below a set of standards.

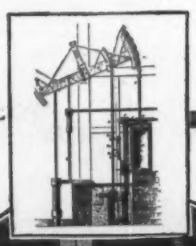
It is evident now that the petroleum industry, at least that part of it represented by the American Petroleum Institute, is not agreeable to the charge of the president and the assumption of the conservation board that "waste and overproduction" exist. It may be that the petroleum industry will seek to defend itself on such charges.

No fact can better serve this end than the record of the refining branch of the industry. Not only has it ac-

(Continued on page 34)

(Frontispiece shows Texas Company refinery at Port Arthur.)

Pressure of Economic Forces



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Technical Subjects to Have Place on Refiners' Program

Meeting at Kansas City Next Month will be New Departure in W. P. R. A. Conventions

FOR the first time the program of the Western Petroleum Refiners Association, meeting in Kansas City March 3, 4 and 5, has been arranged along group lines.

Another departure is the type of program for the second day, which has been designated a "plant operators" session. This part of the program has been arranged through the manufacturing committee of which C. L. Henderson is chairman.

While not listed on the program, the convention will hear of the newly created Federal Oil Conservation Board. In his report, Fayette B. Dow, counsel for the association with headquarters in Washington, will touch on the purposes, workings and other details of the body now functioning, after being named by President Coolidge.

Plans are being made for a record attendance. The turn for the better in the industry and the type of program arranged are expected to draw the best attendance ever known to the association. The group session of interest to plant operators is expected to have an appeal for the technical men of the refining industry. Many, who do not hold memberships, personally, will come as guests of the association and the companies for which they work to take advantage of the papers along technical lines.

This part of the program will turn into a general discussion of refining practices and methods, as the purpose is to throw the meetings into open discussions, at the conclusion of each paper. Questions will be asked by those in the audience. Those hearing the remarks will be free to express their own opinions on the topics.

The first day will bring group sessions for traffic topics and for credits. Traffic will be considered during the morning. D. W. Moffitt, vice president of Cosden and Company will preside. Claims for outage will come first and an open discussion will be sought.

The proposed readjustment of rates in the southeastern territory will be considered from the point of what the Western Petroleum Refiners association should take in the matter.

Aside from the topics listed for this session, the meeting will be so conducted that other questions of traffic may be considered and discussed.

In the afternoon of the first day the annual report of the president will be heard, as well as that of the general counsel. At this time the meeting will get a report on the Federal Oil Conservation Board.

This will be followed by the group session of credit and sales managers. F. L. Miller, vice president of the Miller Petroleum Company, and M. D. Creel, credit manager of the Marland Refining Company, will speak at this time and their remarks will be followed by open discussion.

The second day will bring the technical program in the morning. This session will bring before the body some of the leading technical men of the refining industry, as well as men of prominence in the manufacture of equipment for refining.

The third day will begin with a breakfast, when two talks will be heard. The remainder of the day will be given over to business sessions of the board of directors, which will be selected at an executive session, following the breakfast program.

The program for the banquet for the evening of the third day has not been completed.

Program for the Annual Meeting of the Western Petroleum Refiners Association Kansas City, Mo., March 3, 4, 5.

First Day, Tuesday, March 3

Registration, 9:30 a. m.

9:30 A. M. Meeting of Traffic Men, D. W. Moffitt, presiding. Subjects to be discussed as follows:

1. Allowances of claim for outages.

2. Protest filed by the association requesting suspension of Leland's tariff No. 79-G.

3. Proposed readjustment of rates of Southeastern territory. What part should the association take in this matter involving substantial increases in rates and which carriers claim are necessary to clear the fourth section violation?

4. Discussion of proposed complaint attacking petroleum rates from Oklahoma to Texas.

5. The association protested the amendment to Leland's tariffs 35-0 and 123 providing that empty tank cars returned must be accompanied by regular waybills, etc.

1:30 P. M. Reports.

F. A. Pielsticker, President's Annual Report.

F. B. Dow, Washington counsel's report.

Credit and Sales Managers Group Session, Geo. D. Locke, presiding.

"Relation of the Sales Department to the Credit Department," by F. L. Miller, Vice President of the Miller Petroleum Company.

Discussion.

"The Problems of Credit," by M. D. Creel, Credit Manager of the Marland Refining Corporation.

Discussion.

Second Day, Wednesday, March 4.

9:30 A. M. Technical program, C. L. Henderson, Chairman Manufacturers Committee, presiding.

"Treating," Dr. C. K. Francis, Consulting Engineer.

"Development of Distillation and Fractionating Equipment."

"Fractional Distillation in the Petroleum Refinery." W. A. Peters, of E. B. Badger's Sons Company.

"Corrosion in a Petroleum Refinery," Dr. F. W. L. Tydeman of the Roxana Petroleum Corporation.

"Developments in Design and Operation in Topping Plants," H. W. Camp, General Superintendent, Empire Refineries, Inc.

"Safety Work in Petroleum Refineries," Ray Miller, Safety Engineer, Marland Refining Company.

Third Day, Thursday, March 5

Breakfast, F. A. Pielsticker, President, presiding.

"Refining Cracked Products in the Vapor Phase," T. T. Gray of Gray Processes Corporation.

"Fire Prevention," H. L. Shoemaker, assistant chief engineer Standard Oil Company (New Jersey).

Executive session of members of Western Petroleum Refiners Association, election of board of directors and president; other business.

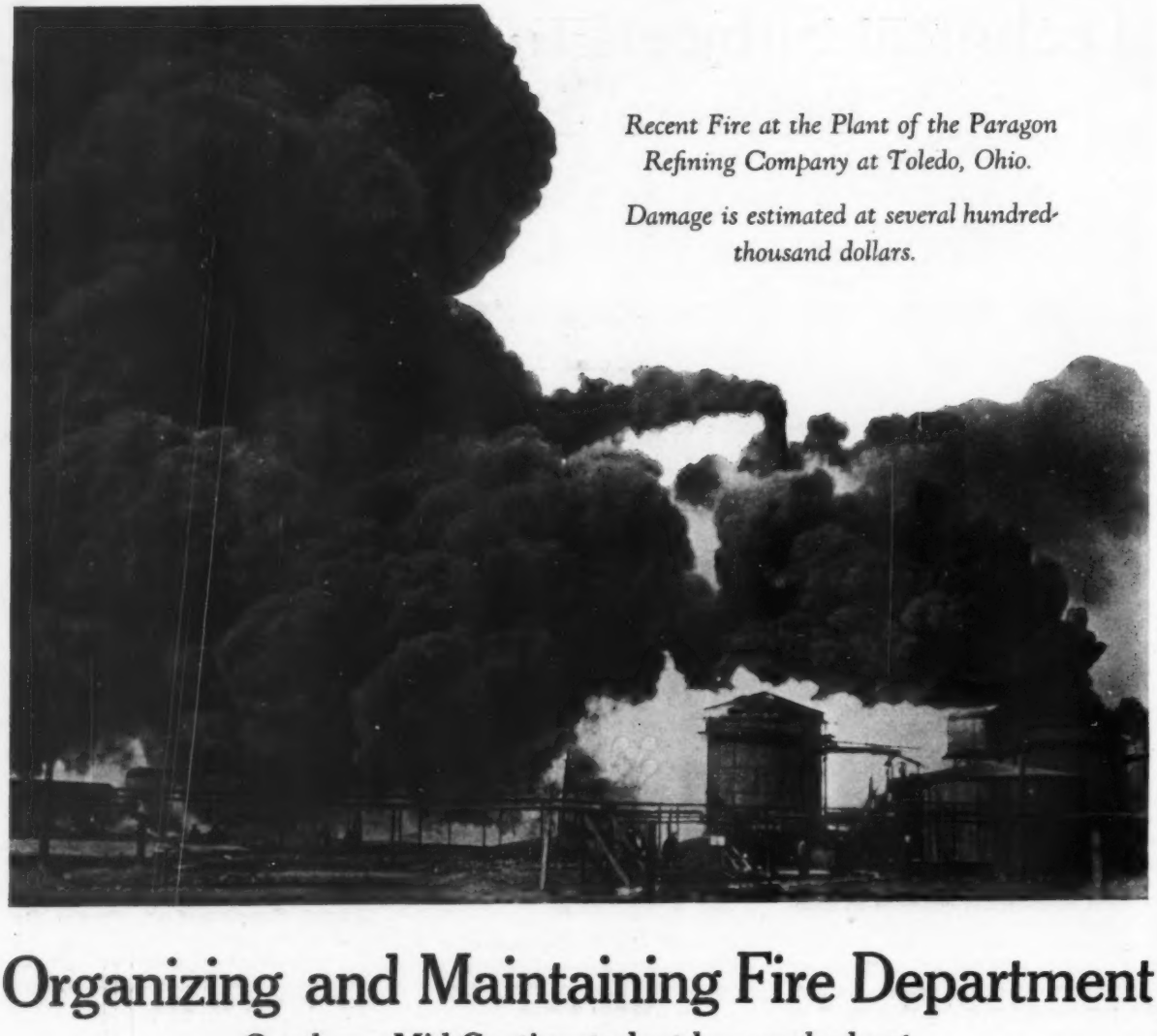
Luncheon, meeting of board and selection of managing director.

Banquet, night, speakers to be announced later.

All meetings at Meuhlbach hotel.

Famous 101 Ranch to Have Private Refining Plant

Ponca City, Okla.—A small refinery is being erected at Bliss under the supervision of Geo. L. Miller of the 101 Ranch. Crude from the company's properties will be used and the output will be consumed on the ranch.



Recent Fire at the Plant of the Paragon Refining Company at Toledo, Ohio.

Damage is estimated at several hundred-thousand dollars.

Organizing and Maintaining Fire Department

One large Mid-Continent plant has worked out systematic method of preventing big losses

By Gwynne Raymond

THE superintendent of a large refinery in Missouri recently remarked:

"Fire drills are all tommyrot; I've been running a refinery for fifteen years and I've never had a fire. I certainly am not going to take my operators away from their work and race them all over this lot pulling hose carts. Besides, all fires are different."

Now that man is riding for a fall! He is playing with fire, both figuratively and literally. He is in the same position as were the United States at the beginning of the war—no preparation, no drilled soldiers, plenty of theory, but no practice. And, to make that man's particular case even more desperate, he has recently added to his refinery some pressure cracking stills. He is going to be greatly disappointed one of these days, when something lets loose and he sees his men get excited and go to pieces in the face of the unforeseen emergency.

That superintendent's experience has been most unusual. I doubt if there are many men who have been in the game any length of time who can boast with him that they have never had a fire. A still bottom may spring a leak despite careful inspection, and fill the ash pits and stacks with flames. A hot tar line may part almost any time and spread destruction. An agitator may flash, or spontaneous combustion may start up among rags or in a coal pile. In fact, there are so very many different ways in which a fire can start up that lucky indeed is the refinery that has gone for even one or two years without some sort of a blaze which has called forth everyone's best efforts to extinguish it without great damage. And since it is poor business to depend on such luck these days when more complicated equipment is continuously being introduced, every refiner should examine well his means of combating fires.

An oil fire is a sight to strike terror into the heart of any but the most hardened old-time operator. Unlike most other fires, it does not kindle slowly, but flashes into existence with a rush and a roar or maybe a deafening explosion. Black clouds and blood-red flames leap high into the sky. Who knows what is going to let loose next? Who knows where it is even safe for a man to stand, out of reach of sudden destruction? What chance has the untrained man to think out the right thing to do under such terrifying circumstances, and do it quickly enough to be of any service? Then is not the time to sit down and reason out just what should be done. Action should

be instinctive. Action can become instinctive only by the constant repetition which is furnished by regular drilling to meet just such an emergency as this. Untrained men can no more properly fight a fire than they could have stayed to battle the Germans under the roar of the big guns. I have seen a dozen excited men all trying to couple a hose up to a fire plug at once —one is enough—then when they did get it coupled, on came the pressure before the hose was unreeled, jerked the reel out of their hands, and spun it off down the road scattering water, hose reel and men! A comical sight, but it wasted valuable time while the fire gained headway. I have seen a stream of water played by half-crazy men on top of a still when the tar line was on fire some distance behind it. I have seen men scatter and leave hurriedly for parts unknown when someone accidentally upset a bucket of paint on a hot line, so startled were they at the sudden puff of smoke. I have seen twenty men lined up along one length of hose. Four to six are enough for any nozzle, and much easier to manage. And, worst of all, I have seen no less than six men all trying to be boss at the same fire, all shouting at the tops of their voices, and the poor workmen not knowing which way to turn.

The superintendent from Missouri argues that no two oil fires are alike, that it does no good to drill because the situations you drill for never happen. It is true that fires do sometimes spring up in the most unexpected places, and all the old timers can tell you of cases wherein the usual methods failed and they put out the fire by some very clever and original trick. Even dynamite has been used. But in nine

An agitator fire.

When fire hits a refinery there is always a tremendous loss of property.

fires out of every ten the "usual" methods will work; for after all, there are only two things to do to an oil fire—get rid of the oil, and smother out the flames. Then why not drill consistently toward solving various problems of getting rid of the oil and smothering the flames? Why not train your men to think fires and to act out fire problems, to imagine every probable condition and then work out and practice a way to combat it? Then when the emergency does arise your men will all have been over the ground before, both in talk and in practice. They can act almost instinctively, with assurance that they are getting the right thing done in the quickest possible time.

Of course, even the best of drilled men are going to get exicted at a real fire, especially if it is of the heaven-roaring, blood-curdling variety, and their conduct is not going to be so perfect as at the drills. But I can testify that they act so much better than their untrained brethren that there is no comparison. After we had organized and drilled one group of men for about a year, the test came. A tar line parted early one morning. The way those men acted was gratifying indeed. The operators went about their business of starting up pumps and getting rid of the oil almost methodically. The hose crews got their apparatus connected up and working in record time. There was much less confusion than before, fewer excited men trying to give orders, and less ganging up of men so thick they could not be handled. Since then I have witnessed many fires both with trained crews and without, and the trained crews always have conducted themselves far more creditably.

How, then, should a fire organization be built? Like any other organization, it should start from the top. The fire chief is the most important part of any fire crew. Upon him falls the entire responsibility, no matter what other officials may be present, and unless he knows what he is about and is effective the whole organization will be ineffective.

The fire chief should be the man who knows most about the operating conditions of the refinery; knows what the stills are running; knows the kinds and quantities of oil in the tanks, and is responsible for the conduct of the operating men. In other words, he should be the active operating head of the refinery, no matter what his title. This responsibility can not well be left to a subordinate. A fire is likely to spring up at any hour of the 24—possibly at night when the acting superintendent is home in bed. The night superintendent, or whoever is in charge during the shift, should then become fire chief. The men should all know this thoroughly. They should know that being fire chief is a part of the duties of the regular acting head of their shift, and that he remains chief no matter who else of the officials appear upon the scene. The other officials should recognize the necessity of this, and should work through the chief on shift and not confuse the men by giving orders direct. They should, of course, have common sense enough to let the chief alone as much as possible.

The chief's first duty at any fire is to take care of the oil and the operations. It is assumed here that no lives are in danger, for it goes without saying that if anyone is in danger or unaccounted for, neither the oil nor any other property will be given one moment's thought until he has reached a place of safety. The chief's second duty is to put out the fire. Each of these duties is a man sized job in itself. Each can well occupy the entire attention of the most skilled man, and combined they are entirely too much for any one man to handle, except possibly in the smallest refineries. It took us a long while to discover this fact. We had drills of all kinds and

much experience at fires, and always the man at the top, the chief, was unable to cope with the rush of the first fifteen minutes of the fire when he was finding a place to put the oil, lining up the operations, ordering numerous details of pumping, etc., and trying at the same time to line up half a dozen fire crews arriving on the dead run and all liable to do the wrong thing unless promptly directed. Finally we decided to give the chief a first assistant. Although this divided the authority, which was very undesirable, there seemed no other way to get the fire-fighting started right. The assistant was made the fire marshal. His job was to take over the second duties of the chief, namely, to smother out the flames. He was to pay no attention to the oil problems. With only brief orders from the chief he was to line up the crews, get on water or steam or foamite as seemed best, and close in on the fire.

The first test of the new scheme was an agitator flash which blew off one of the doors and started burning quite merrily. The chief shouted a couple of orders to the marshal, and disappeared into the agitator pump house. Here he had a lively half hour getting pumps going, lining up tanks, and figuring where he could put the oil without contaminating other products. Later, as the oil in the agitator heated dangerously, he had to watch pumps and tanks closely and decide when the danger point was reached, or he would have another fire started.

The marshal lined the crews up to hydrants as they arrived, directed their streams, sent back for chemical engines, kept the surrounding tanks and agitators cool, relieved his nozzle men, and crowded in on the fire. After the first rush was over he looked up his chief, and received additional orders. The insurance inspector who (as usual) happened to be there that day said it was one of the most satisfactorily handled fires he had seen. It happened that this fire presented unusually difficult pumping problems, too, as all the tanks were nearly full and the fire chief would have been unable to handle the situation without help of some kind.

The fire marshal should possess qualifications complementary to those of the fire chief. He should be the man who knows most about the fire fighting equipment. He should know where hydrants and hose carts are located, where extinguishers and chemical engines are kept, and should be the man who has had most to do with drilling the fire crews so that they will be used to working under him. In a refinery which affords a fire inspector, he should be the marshal. Otherwise, the master mechanic or the repair foreman can well serve. At night the repair foreman or the head watchman or some other person of authority who is not likely to have a fire in his own department must train for this position, and must continue to be marshal at all night fires, no matter who else comes upon the scene.

These two men are the brains and backbone of the whole fire organization. They must, working together, know how to meet every situation; their orders must be recognized as law during the emergency; and they must see that they are obeyed even to the using of pick handles is necessary.

The emergency duties of the chief's men, that is, the operators responsible for the oil, are practically the same as their normal, daily duties. These men stay at their ordinary working posts, and do not have to be grouped into new units for the occasion. Nevertheless the chief should continually train them to meet emergencies. They should imagine certain fire situations existing, and then determine just how to work out of them. It is only by repeatedly solving problems like this that they can learn their lines and valves and pumps and tanks, etc., well enough so that they will know just what to do when something goes wrong. In working out such problems the operators will be told that when their department is on fire their first duty, like the chief's, is to save the oil. Some of them may be assigned to fire crews, but they are to forget about that entirely when their own department is in danger. They are to turn on fire steam, start pumping out, and protect surrounding equipment until the chief arrives to give them orders. They must trust to the other departments to put out the fire.

The supply of men around an operating refinery is decidedly limited. In order to muster out even a few fire crews, especially at night, some of the operating departments are going to have to be robbed down to the fewest possible men whom it is thought can keep going temporarily. And these few men who are going to be left must be taught just how they are to handle their equipment with the reduced forces. Unless this is done thoroughly, disaster is likely to happen to some department which has been left undermanned at a fire or even at a drill.

The supply of steam, high pressure water, electricity, etc., is of vital importance during a fire; and the firemen, pumpers, engineers, etc., must be impressed with the importance of their remaining on duty and keeping going. The normal human tendency of all these men is to rush to the fire to get in on the excitement and help put it out. This must be suppressed.

The fire fighting force which falls under the marshal should consist of a few crews of about six men each, who can fetch hose carts or chemical apparatus, a mechanical crew consisting of a few pipe fitters, electricians, machinists, etc., to do emergency work of their trades, and a first aid crew. These crews should be manned from positions which are filled 24 hours a day, and from positions from which the men can be spared to fight fires without seriously endangering their own departments. For instance, the head pumper of a pump house would not properly be assigned to fire crew duties, for he could not well be spared from his post during an emergency. However, if he has an assistant, the latter can be assigned to the fire crews. All of these limitations make it very difficult to find enough operating men to organize even four or five crews.

Water is still the mainstay in fighting fires, and the men should first be organized into hose crews. Each crew should consist of a captain, two nozzle men, two hose men and a hydrant man. The captain is to be in absolute charge of his crew, and they must take orders from him only, during the emergency, and must obey him implicitly. He in turn must take orders only from the fire marshal or the fire chief. Four trained men can handle the business end of an ordinary 2½-inch fire hose, and after a little training and actual experience can move it about much more readily than can a dozen untrained men. Two of these men will handle the nozzle, and two of them will keep the hose straightened out just behind. One man should always be left back at the hydrant, and he should turn water on or off only at the direction of his captain.

Positions on these hose crews are to be considered part of the duties that go with certain operating positions. When a new man takes one of these positions he automatically becomes a part of the hose crew. For instance, when a man becomes outside helper of the crude stills he at the same time becomes captain of the crude still hose crew. In this way the crews always have their full quota of men, regardless of changes in the operating forces. Moreover, the crew positions should be so selected that as a man gets promoted in operating work he is first hose man, then hydrant man, then nozzle man, and finally captain. In this way, by the time he gets to be captain he is fully familiar with the duties and responsibilities of that position.

The mechanical crew should have a captain appointed from its membership, and during the emergency the men should take orders from this captain only, and not from their regular craft foremen.

Around a refinery, no matter how small, there should be at least one man who knows a whole lot about first aid, and his job in case of a fire should be to get to the scene of action and render relief. If the plant is large he will, of course, have assistance. One man should preferably stay in the first aid room, and handle all phone calls for doctors, ambulances, etc. Incidentally, other interested and kind hearted people should be strongly dissuaded from taking it upon themselves to make these calls. I remember one incident when two doctors and two ambulances came tearing down the

(Continued on page 18)

Organizing the Refinery Fire Squad

road post haste to a refinery, to take care of one slightly injured man, all because too many people had taken matters in their own hands and sent for help.

Some years ago the operators of a certain refinery were called together, given a talk on fire fighting, and handed a set of fire rules similar to those reproduced at the end of this article. About a week later it was decided to try a fire alarm, to see if the men had studied and learned those rules. The alarm was given, the siren shrieked, and—pandemonium broke loose. The fire was supposed to be at the barrel house. The crew nearest the barrel house started as hard as they could go for the other end of the plant, without their captain and without their hose cart. Along the way they were joined in the chase by two or three other men! Another crew arrived with ten men instead of six, and a third arrived with only three men. None of the crew captains had much control over his men. One of the crews wound up in the middle of an open lot, with their stream of water falling a good 200 feet short of the supposed fire. The whole drill was surely a disappointment, except as a comedy. Why? Because we started in at the wrong end. We gave them the whole dose and expected them to swallow it.

Since then we have learned much about drilling for fires. The purpose of the drills is to get the men entirely familiar with the apparatus they will have to use, and the duties they will have to perform at a fire, and also to get them to thinking fire problems in connection with their daily work. The fire marshal now takes out one crew at a time, introduces them to their apparatus, and leads them slowly through the drill of taking the hose cart from its house to the hydrant, unreeling the hose, and actually playing the stream of water upon an imaginary fire, then disconnecting a section of broken hose and getting the water back on, moving the hose about under pressure, and finally reeling it up and putting it away. The men would then go through this drill on the run, just as they would at a real fire. A set of instructions as it was worked up for this simple drill is given at the end of this article. It was found that it paid to work out this drill as carefully as Uncle Sam works out the drills of firing his field guns. The mechanical crew is assembled, and practices various emergcy pipe work, electric wiring work, etc., becomes accustomed to its emergency captain, and learns where its fire tools are kept. The first aid crew practices various forms of emergency bandaging, burn treatments, etc.

Finally, after each of the crews has thus been drilled alone several times, a general fire drill is advertised. This is by no means a secret affair. Both the time and the place of the supposed fire are announced, and the men are told to think out in advance all the moves they are going to make. The alarm is sounded exactly at the time set, and the fire chief and the fire marshal handle the crews through all the maneuvers which are likely to come up in connection with a real fire at that location. A man is assigned to observe each of the crews from the moment the alarm is sounded, and after the drill is over the captains, the fire chief, the fire marshal, and these observers gather together to discuss the drill. The observers report the times taken by the different crews to perform their drills, and make comments on the way the captains and their crews have handled themselves. A healthy rivalry is created between the different departments to have their crew make the best showing. The fire drill is discussed in general, and many valuable suggestions are received from the men. These advertised fire alarms are executed about once every two weeks or month, each in a different part of the refinery, and each under different operating conditions. Thus the crews and the operators are trained to work out all manner of fire problems, and the time-worn argument that each fire is different is stilled.

Many are the lessons that are learned from these drills. One part of the refinery was found to be quite inaccessible to the crews, and a piece of new road had to be built. It was impossible to get the hose carts into one tank farm, and hose had to be stored in houses over the hydrants. Some of the men did not even know their way about in distant parts of the refinery before these drills! I have already told how these drills proved to us that it was too big a job for any one man to handle all the problems of a fire, and how we broke this up into the two jobs of the fire chief and the fire marshal. The spirit of friendly rivalry between the men has considerable influence, and the men and the management are brought closer together, particularly when visiting officers are invited to witness these drills and talk to the men afterwards. Only very occasionally is a secret drill pulled off, to determine just how the men will act when a fire accurs at some unforeseen time and place. Too many of these secret drills are a detriment. The men grow stale. They strongly resent being called out to run the length of the refinery hauling a heavy hose cart to find that it is a false alarm. No such resentment seems to arise when the drill is advertised and the men know they are competing with each other and against time. It has been proposed that some sort of a reward be given the department having the best showing over a period of months.

During the winter months the marshal drills individual crews again, as this imposes less hardship on the men, and sometimes several months are allowed to elapse between regular drills if the organization seems in good condition.

The fire marshal at this refinery has made himself a position of considerable importance, and he is indeed a busy man. His is the responibility for the upkeep of the fire apparatus, including hose carts, hydrant hose houses, high pressure water system and pumps, chemical engines, fire extinguishers, steam fire hose on still batteries, sand pails, foamite systems, fire steam systems, fire alarm, and so forth. He is continually going over this equipment and seeing that it is in condition for instant use. Before he was appointed a large agitator had flashed one cold winter noon, and we were dismayed to find the fire steam lines frozen up and useless. The fire burned for an hour. Now the fire marshal keeps a close watch on this piping all winter, and such a catastrophe is not likely to happen. At another time a wooden paint shop disappeared in flames one night, probably due to spontaneous combustion of oily rags. Now the fire marshal wages a continuous war upon trash and rags of all kinds, especially those that decorate radiators and steam piping. Fire steam hoses used to get borrowed from still batteries for other workaday purposes quite frequently. Now the fire marshal checks up regularly to see that they are all in place. At the end of each month the marshal makes a written report of all the activities of the fire fighting work, together with an inventory of all fire equipment. He is made to swear to this before a notary, to impress him with the importance of the whole work.

The set of fire rules printed at the end of this article are similar to those worked up by one of the larger refining companies for a complete 5000-barrel a day plant. There are certain points of these rules that deserve comments; as, for instance, the rule as to who shall turn in fire alarms. Much annoyance has been caused by the turning in of unnecessary alarms. One afternoon there was a slight flash in a coke still which had been unplated too soon. A watchman on the railroad track about a quarter of a mile away saw the smoke and rushed in a fire alarm right from where he was. The siren blew and the crews all came running, but, of course, no fire could be found along the railroad track, and the coke still was plated up again and perfectly quiet by the time the crews got there! The crews did not feel very friendly toward that watchman, for the afternoon was very hot and the men were thoroughly worn out by their run. The watchman had done two things he should not have done. In the first place, he had reported the fire from the railroad track instead of from the coke stills, and in the second place he didn't have any business turning in the alarm at all, at least without first investigating to see if the operators were on the job. For many of the small flashes which occur around a bat-

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Built to be taken down. Phillipsville Natural Gasoline Plant of the Waite Phillips Company.

Building With an Eye for Tearing Down

Economical construction with Waite Phillips Company, allows the greatest in salvage

By Grady Triplett
Staff Representative

WHEN a natural gasoline plant is designed by the Waite Phillips Company a weather eye is kept on the day of dismantling it. The whole process is one of building in order to tear down.

For the true economy in the experience of this company is not in building at low cost, but in building to allow the greatest amount of salvage. With this in mind, executives of the company have changed some methods and practices, which were followed in previous years.

One of these changes has been to adopt the policy of buying standard gasoline plant equipment instead of making equipment in company shops. It was once the practice to build heat exchangers, for the company could build one cheaper than it could be bought ready for installation. But when it became necessary to move, the built exchanger resulted in either total loss of the equipment or an excessive labor charge for tearing it down to be replaced, while one of standard design could be moved at little expense and with no damage to the equipment.

Small stills of patented manufacture have been found to have greater salvage value than those turned out of the company shops.

Buy It Cheaper

Even cooling towers have been found cheaper when bought ready for installation, when the day of moving is considered. A "home built" cooling tower is a cheaper product with the Waite Phillips Company and it will serve to as good purpose as a manufactured one. But the company never constructed one that had any value from the salvage standpoint, while those designed by manufacturer have been found easily dismantled and moved with no loss except the bolts.

Just recently the company has adopted the policy of housing its natural gasoline plants in buildings that offer the most in salvage value. This is another instance of running the first cost of the plant above what would result if company built, but the saving comes when moving day comes.

In all pipe work, no joint ever is welded when a coupling will serve, for the design of each plant is preserved and when it is moved, the equipment is so placed that the piping can be transferred and installed on its old specifications. Headers, which are welded as are some gas connections, are carried with each unit from plant to plant.

Foundation Construction

More and more the Waite Phillips Company engineers are striving to arrive at a plant design which will result in only the foundation being lost to salvage, when it becomes necessary to transfer either part or all of a plant to a new location.

As foundation construction is studied, the engineers are learning that great saving can be accomplished here by studying soil conditions and rock at the plant site, in order to determine the minimum concrete specification for the foundation. There was a time when the specification was determined, after which it was doubled in order to make sure carrying the load. But the dismantling of the plant left an unnecessary expenditure to be lost upon moving the plant.

An auger of the post hole digging

variety serves good use when a plant site is being selected by company officials. Holes are dug in effort to find rock near the surface. While the search is not always successful, the search saves so much concrete when it is successful is that the time spent is profitable.

Designs Always Checked

When the site finally is selected, Kent's scale is used for the specification. And instead of doubling the specification to make sure, the scale is followed. This has been found sufficient. For the experience of the Waite Phillips Company is that enough concrete is enough, while double the amount is useless expenditure in the first place and double loss when the plant must be moved.

When a plant design is drawn it is checked in the office of R. R. Dean, superintendent of natural gasoline plants. This checking process is to cull out the instances where a product of small salvage value has been specified and to replace it with something of higher salvage value.

Some Economies

Here are some of the economies that have been accomplished through this checking process.

A discarded condenser box will make an excellent oil sump and it can be taken out of the ground and moved. A concrete sump gives excellent service, but it must remain when the plant is moved.

Once it was the custom, in laying concrete floors at natural gasoline plants and pump stations to cover pipes with no thought of removing them. But checking design and seeking higher salvage methods has resulted in floor specifications which will allow salvage of pipes, as well as permit repairs in case of damage.

Plants are so designed that all pipes can be laid in one or more troughs in the floor. Whatever the space necessary to accommodate these pipes, it is set out not to follow the usual floor construction. Instead a trough is made. The pipes are placed at the bottom of it. Then the pipes are covered over with sand, which is filled in to within two inches of the floor level. The remaining two inches is covered over with concrete, giving the whole floor the appearance of a concrete slab of uniform thickness.

But a small hammer can break through the two inches of concrete over the pipes, while the sand makes it possible to have access to the piping either for repairs or removal.

Using Discarded Casing

Oil well casing no longer serviceable in the fields supplies material for the vacuum lines at a Waite Phillips natural gasoline plant. That is the result of checking design and the use of the reclaim department maintained by the company, something that presents an interesting angle of itself. Casing that is wire line worn comes to the stage that it is not safe for putting in a well. But in that state it makes as good vacuum line as will new pipe, provided it is put in proper condition.

This casing is taken from the producing department and put through an inspection. If the threads are good it is installed as a coupled line for the vacuum station. Some good lubricator is used in making the joints, one that will allow salvage of the pipe. If threads are in condition not to stand use as a vacuum line the pipe is cut, its ends beveled and a welded line is made.

This selection of discarded casing for vacuum lines is but one step in the use of equipment that may have seen service in some other department of the Waite Phillips Company. Wherever possible a piece of equipment is bought so it will be interchangeable. Take pumps. A pump of standard make may be bought for the crude oil pipe line department. But it may later come into use around the refinery and from there it may be transferred to the natural gasoline department.

Valves Reclaimed

Valves, except those bought for special purposes, are of standard design so they can be used in either department of the company. A part of the work of the reclaim department is to work over valves and keep a list available. When any sort of construction is undertaken, no purchases are authorized until it is known what equipment is available from the shops, where equipment is reclaimed.

These practices have increased the cost of new natural gasoline plants for the Waite Phillips Company. But they have reduced the whole construction cost of natural gasoline plants for the company, for they permit the dismantling and removal of equipment.

Plans and specifications of all plants, of course, are preserved. When construction involves the dismantling of an old plant, the new one is built on the specifications of the one being abandoned. Then it is but a matter of moving the equipment and setting it up as it was originally.

Mid-Continent Refineries Were Running 386,900 Barrels to Stills on February 1

Tulsa, Okla.—Mid-Continent refinery runs of February 1, are 14,800 barrels higher than the runs for the first day of the previous month. The total for the first day of the current month was 386,900 barrels as compared with a total of 372,100 barrels on January 1.

Outside of the fact that Oklahoma shows a gain of 11,500 barrels for the day, no material gain or loss is recorded in any of the other states. Following is a compilation of the comparative runs of February 1 and January 1.

State—	Barrels
Oklahoma—	
February 1	178,500
January 1	167,000
Increase	11,500
Kansas—	
February 1	66,750
January 1	63,400
Increase	3,350
North Louisiana—	
February 1	26,350
January 1	26,400
Decrease	50
North Texas—	
February 1	91,500
January 1	90,200
Inerease	1,300
Arkansas—	
February 1	12,800
January 1	12,500
Increase	300

The total for Kansas does not include the runs of the Neodosha plant of the Standard Oil Company (Kansas) which is approximately 12,000 barrels daily, comparable to a like amount of oil being run on the first day of January.

The opening up of the Gilliland Oil Company plant at Ringling, Oklahoma, is responsible for a small part of the 11,500 barrels increase for the state. This plant, with a daily capacity of 1500 barrels is now running 1000 barrels daily.

In Kansas, the starting up of the Waite Phillips Company refinery at Wichita is responsible for three thousand barrels of the total increase. This is the refinery which was purchased from the receivers of the Sterling Oil & Refining Company and revamped by the Waite Phillips Company. The Phillips company are running the three thousand barrels from the Rainbow Bend field in Cowley County, one-half of which they own. The remaining half of the Rainbow Bend production is being run to the Ponca City refinery of the Marland Refining Company. The capacity of the Waite Phillips refinery at Wichita is 5,000 barrels.

In Texas the Falls Refining Company, located midway between Iowa Park and Wichita Falls, which was formerly the property of the Bankers Oil Company is now operating. With a daily capacity of 1200 barrels the runs on February 1 were 1000 barrels.

In Arkansas, the Houston Oil Company is running 950 barrels through their partially completed plant. The ultimate capacity of this plant will be 5000 barrels but only 3000 barrels of this capacity has been completed to such a stage that it can be used.

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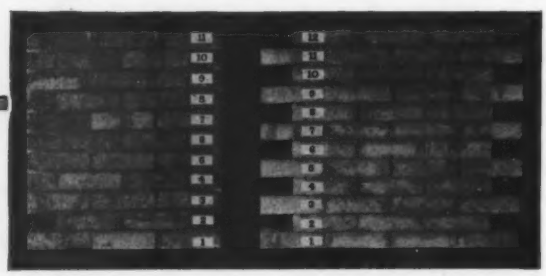

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Note: The fire clay wall shown is much better than average practice.

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Furnaces are lined with fire brick, suitable to withstand high temperatures. These brick are laid together with either fire clay or high temperature cement. The high temperature cement has to a great extent taken the place of fire clay in recent years, especially where extremely high temperatures are required. This cement is applied between the brick in the form of a paste and a thin layer is spread over the face of the brick. After the furnace has been fired, this cement unites the brick into a solid wall, and forms a glazed surface over the brick, thereby protecting the brick from disintegrating under the extreme heat. This is higher in price than the fire clay but increases the life of the furnace.

The fire brick lining is insulated from the main part of the wall by either an air space or some insulating material. This space varies from two to eight inches in width. There are various materials on the market for filling this space, some in the form of powder and others in the form of blocks. Such material should be a poor conductor of heat, should expand little, if any, upon heating and should not lose its heat resisting power under continuous heating. Some materials have been classed as having a high degree of heat resisting power but will break down after several months of use.

R. L. Walde in the Oil and Gas Journal.

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HYTEMPITE used for laying fire brick showing Portion of Arch of Refining plant at Wichita Falls, Texas. (Cross process.)

HYTEMPITE is carried in stock for immediate delivery by our distributors located in all oil fields and industrial centers. Write us for Booklets HO-109 (Hytempite) and WO-110 (Insulation).

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Solving the Hard Water Problem

Complete water treating plant helps Saskatchewan plant of Imperial company

By E. A. Duschak

Mechanical Superintendent Regina Plant of the Imperial Oil Company

One of the important points considered in the selection of refinery site is a suitable water supply. The water supply should be abundant and a certain percentage pure and soft for the steam boilers. The remainder need not be of such good quality, but should be easily obtainable if possible. At times other factors outweigh the question of water supply and the location chosen may not furnish a supply as suitable or accessible as desired. Such is the case in regard to the Saskatchewan Refinery, located at Regina in the center of the prairies. Southern Saskatchewan has few lakes or streams situated so as to furnish a site for a Refinery, and the water for the above Refinery is all obtained from wells. This means that to obtain a sufficient supply presents quite a problem and the water when obtained has a degree of hardness which makes it unsuitable for boiler use.

Building for housing the water softening system

During the first four years of operating the refinery at Regina water from the wells was used for boiler feed water. Due to calcium and magnesium salts in the water a heavy hard scale is formed in the boiler. The forming of scale results in a loss of heat and decreased efficiency, increased labor of attendance, increased cost of repairs and increased cost of operation throughout. To prevent the forming of scale a boiler compound is used. This is only effective in part as a certain percentage of scale will be formed, and the compound also causes a large precipitation to the bottom of the boiler. Besides being injurious to the shell of the boiler, it requires frequent "blowing down" which is a further loss. The use of this hard water also causes foaming which is detrimental to good boiler operation. And corrosion which decreases the life of the equipment. The expense of operating the boiler plant led to the decision to install the necessary equipment to treat or soften the water for the steam boilers.

The system installed at Regina is called the We-Fu-Go Water Softening and Purifying System and consists of treating the water with lime (90 per cent available calcium oxide) 58 per cent Soda Ash and Ferrous Sugar Sulphate. The equipment is installed in a building 52 feet 6 inches x 27 feet 6 inches consisting of basement, wholly of concrete, for treated water storage, first story of concrete columns and beams and brick walls and second story of wood frame covered with galvanized iron.

The water is pumped from the wells by motor driven deep well pumps to storage and from there pumped by steam pumps located on the first floor of the softening building to the reaction or settling tanks on the second floor. These are wooden tanks 23 feet in diameter by 17 feet 4 inches high and equipped with steel paddles to stir up the reagents and the raw water. The paddles are operated by shafting and gears from floor below. On the first floor is also located the reagent mixing tank. The limes, soda and ferrous sulphate are thoroughly mixed in this tank by means of a stirring device with sufficient water, and then enough water run in so that mixture can be pumped by a small centrifugal pump to the reaction tanks above. In the reaction tank after thoroughly mixing the water is allowed to settle and the sludge deposited is washed out after every third tank and pumped to open field where it is allowed to spread over the ground and dry out. The water, after settling, runs by gravity to the filter tanks on the first floor and is purified by passing through the filter bed and then flows to the treated water storage underneath. From here it is pumped to the boilers as required.

The purpose of this article was to give some idea of the difficulties in the way of procuring suitable water for the boiler plant at Regina, but a few words might not be amiss to show that all is not well, when a water supply is obtained from wells. In the first place, the location of a well is based on the information which can be secured as to where water was found previously and the indication of the probable flow or storage of water underground. But with all the above information on hand, wells will be drilled and fail to bring forth water. This means at Regina drilling approximately 100 feet. Then after the well is drilled it develops contrary streaks and to get the well in shape to operate the well pump successfully often is very discouraging and success is achieved only after considerable time and labor.

This hard water when it becomes hot deposits scale, as stated previously, and when used for cooling the con-

Sewer tile removed from pressure still after 15 months service, showing alkali deposit.

How Stabilizer Effects Large Saving

Flow sheet for West Virginia plant gives insight as to what new apparatus can accomplish

By J. F. Carter, Jr.
Staff Representative

ALTHOUGH stabilized gasoline is not an entirely new subject in the natural gasoline manufacturing industry, its potentialities and its application to present day methods of plant operation are, perhaps, of more vital interest today than when the process first was introduced to the trade.

A rather comprehensive description of the natural gasoline stabilizing process as applied to actual plant operation in the Burkburnett field of North Texas was detailed by L. F. Bayer of the Tidal Refining Company in the May, 1924, issue of The REFINER and NATURAL GASOLINE MANUFACTURER.

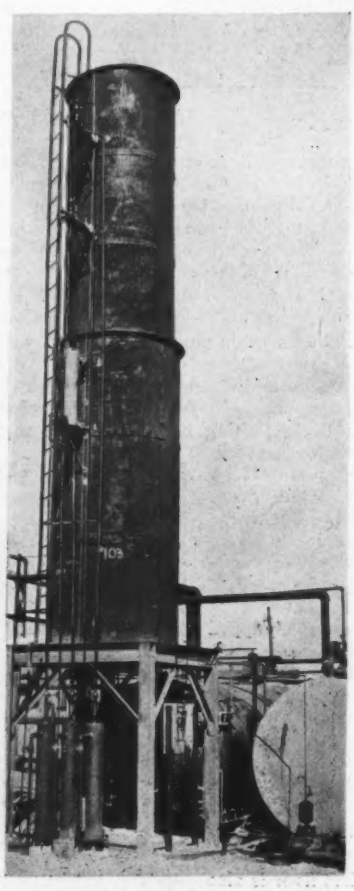
However, a detailed study of the general characteristics of the natural gasoline stabilizing process as evolved by the Carbide and Carbon Chemicals Corporation of New York at their plant at Clendenin, West Virginia, throws additional light on the subject and offers to natural gasoline manufacturers a comprehensive analysis of the workings of the process in its varying stages of commercial development.

The process has been in successful commercial operation at the Clendenin plant since some two years prior to 1923. This plant was of the usual type of oil absorption plant as the gas was being compressed to 250 pounds per square inch for transmission purposes and the absorption being made at this pressure. With very few changes the stabilizing process was added to the original equipment.

Herewith are reproduced two charts showing the flow diagram of the plant before installation of the process and after installation.

In the diagram it will be observed that the gas was compressed by a two-stage compressor and the heat of compression removed in cooling coils. It then passed through a trap that freed it from any moisture, lubricating oil or other substance that might have been carried by the gas. The gas passed to the absorbers from the trap. In the diagram the absorbers are of the horizontal type, three in series. There the gas came in contact with and was scrubbed by the oil. It will also be observed that the outlet gas passed through a trap into the transmission line.

The succeeding stages of operation in this plant was similar to that of the usual type of plant. The vent gases were used as fuel and the pre-cooler, inter-cooler and after-cooler condensates were combined in the stock tanks with or without naphtha blend to produce the natural gasoline. The product as was usually the case was highly volatile and required a further treatment in order to prepare it for transportation or use.



Installation of the Stabilizer at the Chestnut & Smith Corporation's plant, Ranger, Texas

The accomplishing of this treatment in order to fit the gasoline for use was by the natural weathering process, the wild product being stored in tanks at low pressure until a sufficient portion of it has evaporated leaving a product that can be safely handled.

Experience has taught that this weathering process permits the losing of dissolved gas and at the same time the losing of a proportion of the true natural gasoline constituents that are carried away by the escaping gas. Furthermore, the resulting product is never free from these dissolved gases.

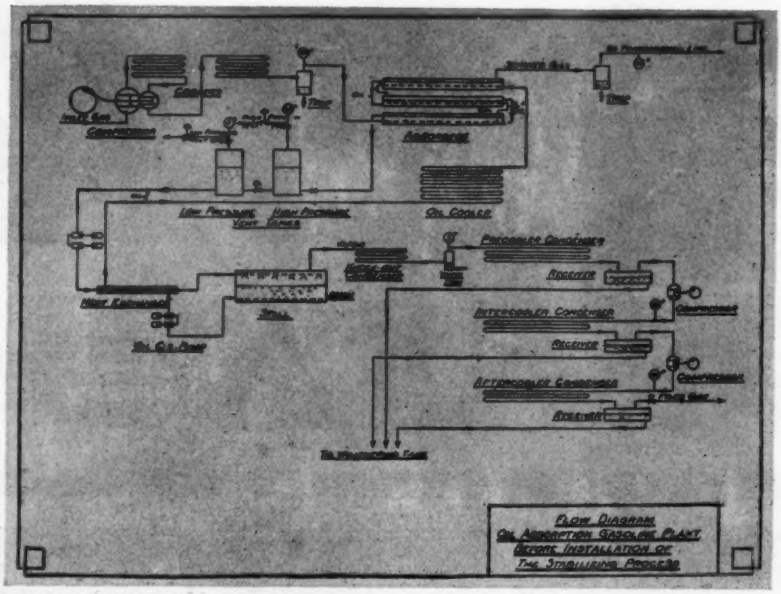
By the natural gasoline stabilizing process this weathering loss is eliminated. What may be termed a sharp cut is made between the gasoline constituents and the non-gasoline constituents. It has been developed that natural gasoline of any specification may be separated, that the composition of the gas treated makes possible and at the same time the wildness producing gases are recovered and delivered for use as fuel.

The manner that this is brought about is shown in the diagram. The pre-cooler, inter-cooler and after-cooler liquids are continuously introduced at appropriate points into the rectifying column. Note that these liquids expand from the pressure at which they are formed to column pressure right at their entrance to the column. The most volatile mixture is introduced nearest the top and that most nearly approaching the volatility desired in the final product is led into the column near its base. The column is provided with trays which divide it into compartments, means being provided for the downward flow of liquid and the upward passage of vapors. Connected to the base of the column is a liquid receiver, or kettle, in the form of a tank that receives the liquid from the base of the column through a U-trap. The kettle also is provided with a steam coil for maintaining the proper temperature in the kettle and with a vapor pipe that leads the vapors evolved in the kettle into the column.

The expansion of the liquids into the upper part of the column produces refrigeration while the temperature at the foot of the column is kept up by warm vapors entering from the kettle. The temperature gradient necessary

---

denser coils at the stills covers the coils with a hard scale. This decreases the cooling effect of the coil and periodically the coils must be cleaned. A sufficient supply for condensing purposes is procured at the least expense by returning the hot water from the condenser boxes at the stills to a cooling pond, where the hot water is pumped through sprays and mixed in the pond with cold water from the wells. Also all overflow pipes and hot water sewers gradually become filled with scale and the life of this equipment is very short compared with the same equipment where soft water is used. A six inch pipe used as overflow from condenser box has filled in one year so that the opening is only two inches. The additional cost of operation due to the use of a hard water for such purposes can readily be surmised, and considerable money could be profitably expended to obtain a soft water supply.



for rectification is thus maintained. The gasoline is withdrawn either continuously or at intervals. The wild vapors, free from gasoline, leave the column continuously through the pipe at the top. A portion of these vapors is recirculated as shown in the diagram for the purpose of augmenting the supply of liquid wash in the upper part of the column.

The control of the natural gasoline stabilizing process is automatic. Suitable regulators are provided for controlling the inlet of condensates, removal of gas, and the control of kettle temperature. Adjustment of the kettle temperature regulator so that a different temperature is held will change the quality of the final product, the pressure of the system remaining unchanged. Increasing the temperature will lower the vapor pressure of the product with a slight decrease in yield and vice versa.

Where the process has been installed the gas leaving the top of the column does not contain a trace of gasoline, the cut between true natural gasoline and wild vapors have been accomplished. The liquid in the kettle does not contain a trace of propane or ethane. It is all gasoline.

In the case of the Clendenin plant the increase in net yield that was obtained through the use of the natural stabilizing process was substantially over that obtained before the stabilizer was installed. The original absorption plant at Clendenin was operated efficiently prior to the installation of the stabilizing process and none of the increase in net yield was a result of plant correction, the company advises, as none of it had been changed since the process became operative.

Although this description has been with reference to the operation of the natural gasoline stabilizing process in an absorption plant, it also is applicable to the compression, refrigeration, activated carbon or any other process.

An explanation by the company as to the adaption of the process to other type of plant follows:

"On all plants of the compression, refrigeration or oil absorption type already built and now in operation, the gasoline stabilizing process can be added with expectation of greatly increased yield, as good or better quality of product, and no increase of operating cost per million cubic feet of gas treated, consequently a much reduced cost per gallon of marketable gasoline produced.

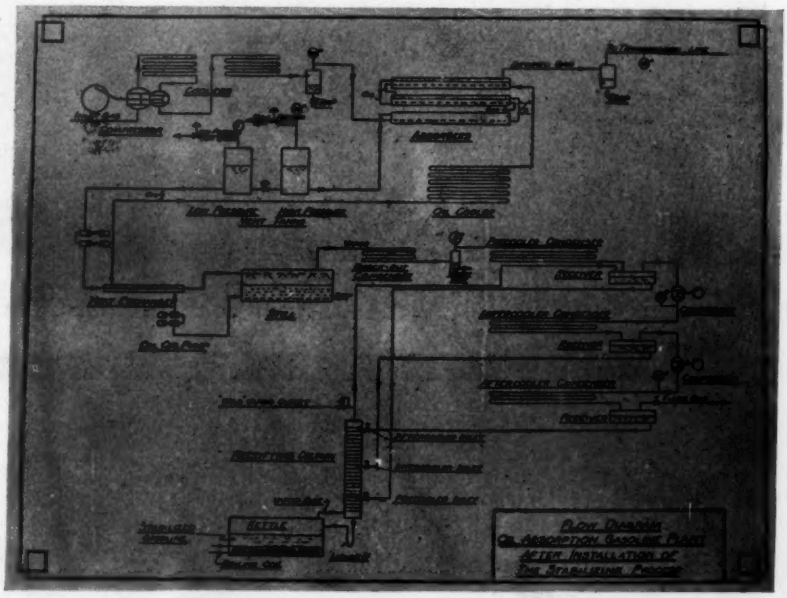
"For plants of the oil absorption type to be built in the future, those treating large volumes at moderate or high pressures can best count on the use of a stabilizer in conjunction with the oil absorption units to give better yields than previously considered possible. Accordingly, plants that heretofore would have been considered impractical on account of too small a yield per million or too small a total production may well be financially successful by the use of the gasoline stabilizing process.

"For future plants treating rich gases by means of the compression or refrigeration processes the gasoline stabilizing process offers a prospect of much reduced weathering losses as well as of the production of a material free from dissolved gases, which in certain cases have characterized the compression process. There has been a tendency in recent years to replace the compression process by the oil absorption process. Such change has much to recommend it, although it may safely be stated that a compression plant with a gasoline stabilizer used in conjunction therewith can produce as much and as good gasoline as an oil absorption plant without the stabilizer working on the same gas. As the investment and operating costs are much lower with the compression plant, the return is therefore more attractive. Such a condition applies, however, only on a very rich casinghead gas.

"On gases containing a considerable sulphur content, it is doubtful whether activated carbon can be successfully used. Therefore, one of the other types of plant can best be counted on for a new plant to be used on high sulphur gases when combined with the stabilizing process.

"When it is of importance in the sale of the product from a given plant, to be able to meet varying specifications owing to variable market conditions, the use of the stabilizing process is highly valuable as it permits the production of material of any reason-

(Continued on page 35)



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Organizing and Maintaining Fire Department

(Continued from page 18)

tery of stills can be put out by the stillmen without raising the hue and cry and turning out the entire refinery.

Upon another occasion, at night, a gentle little blaze was seen flickering out of a steam tunnel manhole. A workman turned in an alarm, waited about two minutes, and then got excited and turned in another alarm. In his anxiety he thought no one was answering his first call for help. A a matter of fact we were all running toward him as fast as we could. The second alarm was supposed to mean disaster indeed! The city fire department and the whole town were supposed to turn out, but the fire was out before they got there! Of course, the first few minutes at a fire are the most valuable, and time must not be wasted holding a debate to see whether or not an alarm should be sounded. However, unless some restrictions are imposed, especially around a good-sized refinery where new men are always being employed, the fire crews will find they have a pretty steady job answering false alarms. On the other hand: A small fire broke out at a still battery one morning, but the operators were so busy trying to put it out and so excited that they did not think to call for help. The superintendent's curiosity was aroused by the smoke and he ran all the way from the office to the stills and then had to turn in the alarm himself. So after all, it is a matter of keeping cool and using common sense.

It is a good thing to divide the refinery into fire zones or wards for the purpose of reporting alarms, and also for working out drills. If the refinery is large it will probably have a pull-box fire alarm system. Such was the case of the one for which these rules were made. A plant telephone system that works is a great help. Nothing quite equals the steam siren for rousing one from deep slumber to go and defend the refinery property, and this siren should be used for one purpose only—to shriek FIRE! I was once located at a refinery in a small town which contained a rival refinery of about the same size. The rival refinery had a husky siren which they used for advertising purposes. Every noon it would shriek calamity; for no other reason than to advertise that it was dinner time over there. The first few days I was in that town I would nearly jump out of my skin every time that siren let loose, for I had been trained that when a fire siren blew it meant business and it was time for action on my part. However, after I had been around for about a month I paid no more attention to that siren than to any other whistle, and if there had happened to be a real fire at that plant I would very probably have automatically started home for lunch! No one has any business getting used to a fire siren. Its prime virtue lies in the fact that it can stir one to instant action at any hour of the day or night.

Now it was unfortunate that the siren at our refinery had almost exactly the same tone and volume as the rival's. So if a siren blew when one was downtown or at home one never knew whether to rush to our refinery to defend property or wander over to the rival's to see the excitement. This situation became so perplexing to the entire force that we finally decided to abandon our siren and substitute a large, deep-toned steamboat whistle. That whistle turned out to have the deepest, smoothest, softest tone I ever heard. But as for rousing to action! Why, it wouldn't have scared a baby perched on the boiler house roof! Shortly after the new whistle had been installed my telephone rudely jarred me awake at 3 o'clock one morning. It was the refinery watchman shouting that there was a fire. I sleepily began to argue with him: "There can't be any fire because I haven't heard the whistle!" There was a fire alright, but the only ones who got to it were those whom the watchman was able to arouse on the phone. Hardly a single soul in the town heard the whistle. Just a few evenings later there was a slight blaze at about 8:30, and again this gentle mannered fog whistle failed to bring help, and that sealed its doom. We got another siren, but we did wish that our rival would stop shrieking FIRE, FIRE! when there was no fire.

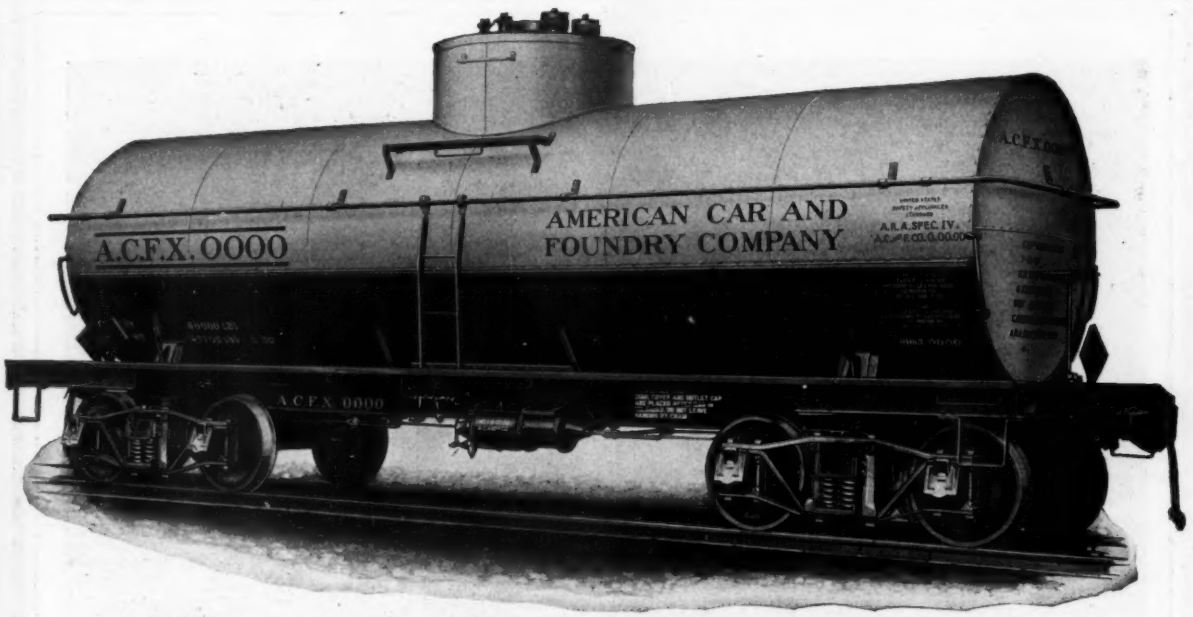
The high pressure water mains designed for fire fighting purposes are altogether too convenient for other uses, as for instance washing down still towers, cleaning sewers, filling tanks, and so forth. It is very necessary to train workmen who are using the hydrants to shut them off promptly upon the alarm of fire. One refinery had an electric pump with an automatic arrangement which kept the lines under constant pressure. This worked splendidly when the lines were not being used, and equally well when they were being used to capacity during a fire, but if someone tried to draw just a small amount of water from the fire mains for workaday purposes, that automatic motor started and stopped itself so often that it soon burned up. After this happened three or four times orders were given that no one should use the hydrants without permission from the fire marshal, who would then disconnect the automatic motor and feed the mains from a steam pump. When the workmen were through with the water they would again tell the fire marshal, who would reconnect the automatic pump. On account of its danger of burning out, this automatic system did not seem so satisfactory as the system employed at another plant where the fire lines were kept filled with water at a low pressure by a bypass with check valve from the plant service, and where fire pumps located in main pump houses under the constant attention of operators, boosted this pressure for fire fighting purposes.

It was at one time proposed to furnish the mechanical crew with a cart or a Ford truck on which could be located a collection of ladders, wrenches, wire cutters, picks and shovels, and other tools which might be of value in emergencies. Such tools always seem hard to find when you want them, and in a large sized plant some such an emergency tool cart might be very valuable.

Tank cars "always happen" to be in the way, particularly when a fire gets started around a still battery. After considerable discussion it was decided to call out the railroad locomotive at every fire alarm during the hours when it was not around the plant. There may be a few cases when there are no cars to move, but the extra cost of calling for a locomotive once or twice for a false alarm is cheap insurance on a bunch of tank cars. And unless the watchman at the gate is drilled always to get hold of the locomotives upon an alarm at night, it is likely to be missing when most needed. Neither the fire chief nor anyone else at the fire has much extra time to think about sending someone for the engine. A little reward of some kind to the engine crew for their promptness in coming to the rescue will be greatly appreciated and will help their speed next time.

Too many men around a fire may be as much of a handicap as too few. During the early history of one refinery there were still large crews of construction men around after the plant had begun to operate. The least blaze and alarm was a signal for all these men to drop their tools and rush in to try to help. Their willingness was commendable, but the way they ganged up made the fire most difficult to handle, and their ignorance of operating conditions and fire dangers made them—well, fools often did rush in where angels feared to tread, and we had to watch closely to keep them out of danger. Orders finally had to be given that no one was allowed to attend fires except those actually appointed on the fire crews. This of course applies with greatest force to the operators whose responsibility it is to stay with their own department and keep it out of trouble. And after the average refinery settles down to steady running there are usually too few rather than too many men around, particularly at night.

Should the city fire department be called upon for help in case of a serious fire and general alarm? This was always a much argued question. Oil fires are altogether a different kind of an animal from the house fires that the city firemen are trained to combat. And they are likely to display as much ignorance and foolhardiness as the construction workmen already mentioned. On the other hand, they possess hose and pumping engines which may be invaluable in boosting the pressure when the plant crews are insistently demanding more water. By in-



Prepare Now—Profit Later

THOSE best qualified to know have recently predicted that the railroads during 1925 will be called upon to carry from 15 to 25 per cent more freight than ever before.

With the big business in store for the year, it seems safe to assume that demand for all products carried in tank cars will be proportionately greater than in any previous year. Also, that railroad movements will be slower. Hence—

The demand for cars, both Class III and Class IV, for both clean and dirty products, will greatly exceed the total number of such cars now in existence. Therefore—

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Best for Wear and Weather

Tank cars suffer the worst treatment of all refinery equipment. Vibration, expansion and contraction, abrasion, and the worst weather conditions are defeated only by the proper paint protection.

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STEEL-KOTE over a proper priming coat means a tough, elastic film of excellent protective qualities, preventing rust, pitting and corrosion. The black shade is preferable and is generally used as a top coater. Most economical because it serves longer and better.

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viting the city crews to attend drills, and by taking time to teach them refinery conditions and refinery fire fighting tactics, their value in an emergency can be greatly increased. The insurance companies usually favor them. One solution is to have them answer every general alarm. A better one is to arrange for their assistance only upon special appeal by the fire chief. It is certain that they should not usually be expected to respond to first alarms, which may mean only small blazes.

Obedience of the crews to their captains, of the captains to the fire marshal, and of everybody to the fire chief must be ever emphasized. A fire presents such a complexity of problems, and it is so much the natural inclination of the American workman to start out on his own hook, and also to give orders to all those around! But if any campaign is to be carried on successfully, everyone must work to a common end, and not each go off on a tangent of his own.

A very great deal could be written about different ways of fighting individual oil fires, but if the chief and marshal having the backing of well trained crews who are used to obeying emergency orders they will be able to work out of almost any situation. The individual tricks which they use will be suggested by the circumstances. One interesting case comes to mind wherein too much steam was a detriment rather than a help. It was at one of the agitator fires already referred to in this article. The fire steam into this agitator was a two-inch line pointing down at 45 degrees from the top. At the start of the fire this line was opened wide under a pressure of 150 pounds. The fire continued to burn quite furiously outside the agitator, despite the enormous volume of steam which was pouring into it and which should have smothered it. Foamite did no good. The fire kept burning until the agitator was pumped dry, and we are now satisfied that that jet of steam was blasting down into the oil and vaporizing it and spraying it out of the agitator doors where it caught fire. If we had had the courage to turn off the steam we might have extinguished the fire much sooner. We changed the arrangement of that steam nozzle and some others after the fire. It is thus that we go on learning by experience. And by experience we know that every refinery should have a well organized and constantly trained fire brigade. And what is the cost of all this elaborate drilling? Almost nothing. The time of the fire marshal, and about one or two hours a month for the crews—and the operations keep going right along, so that even this is not lost time.

FIRE RULES — WHO SHALL TURN IN FIRE ALARM

1. When you see a fire, hunt for the head of the department where the fire is.

Tell him about the fire. He is responsible.

If the fire is at the stills, get the stillman.

If the fire is at the agitators, get the treater.

If the fire is in the barrel house, get the barrel house foreman. And so forth.

Do not turn in an alarm yourself, unless you are sure that the man in charge is not at hand; or unless you are sure that a delay will cost serious damage.

KEEP COOL

2. If the fire is in an unoccupied building or a tank in the tank farms: You turn in a fire alarm.

HOW TO TURN IN A FIRE ALARM

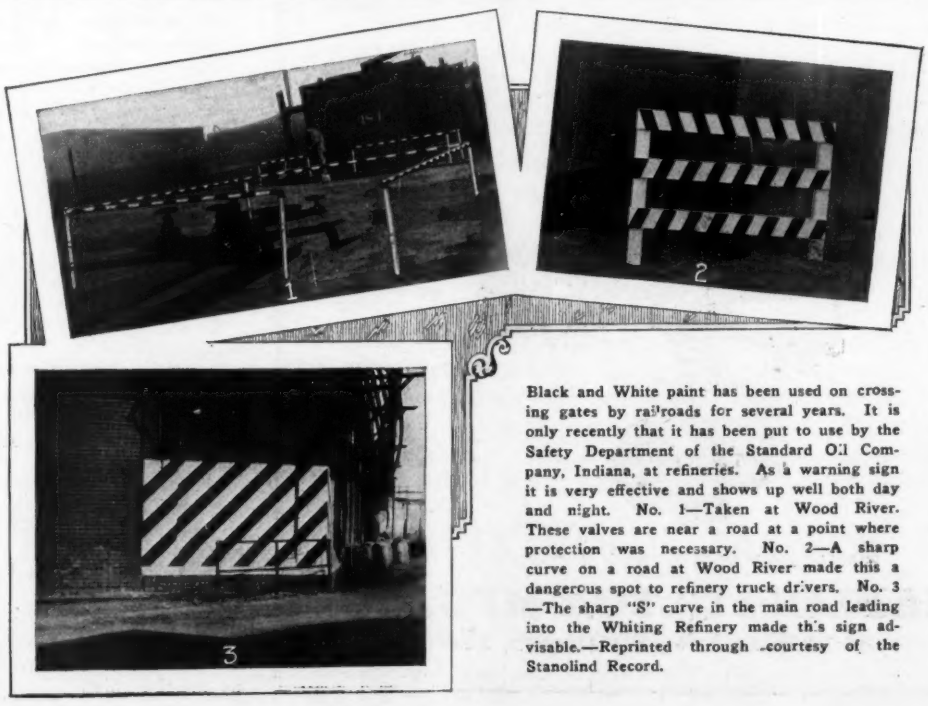
3. Pull the fire alarm box nearest the blaze.

Do not pull any other box. This would give a false alarm. Or

4. Tell the power house where the fire is:

Plant phone No. 8. Bell phone call "Power House" on the plant switchboard. Bell phone No. Main 490 at night. Be sure to tell the power house exactly where the fire is by telling which fire alarm box it is nearest.

BROUGHT TO LIGHT—SAFETY FIRST



Black and White paint has been used on crossing gates by railroads for several years. It is only recently that it has been put to use by the Safety Department of the Standard Oil Company, Indiana, at refineries. As a warning sign it is very effective and shows up well both day and night. No. 1—Taken at Wood River. These valves are near a road at a point where protection was necessary. No. 2—A sharp curve on a road at Wood River made this a dangerous spot to refinery truck drivers. No. 3—The sharp "S" curve in the main road leading into the Whiting Refinery made this sign advisable.—Reprinted through courtesy of the Stanolind Record.

5. Power house sound fire alarm.

Blow three blasts of the siren, indicating fire. Follow this by short shrill blasts to count the number of the alarm box pulled. Thus:

Box Thirteen - ---

Box Twenty-six -- ------

Location of fire alarm boxes.

The fire alarm boxes are numbered in order and in groups of threes, so they will be easy for you to remember. The first group of three is along the extreme south edge of the plant. The next group is just north of it, and so on. The last group is along the north edge of the plant.

The lowest number in each group is to the east. The highest to the west. Thus:

11. South road: at corner of old power house.
12. South road: at wax plant press house.
13. South road: near carpenter shop.
21. Power house road: near petrolatum pump house.
22. Power house road: near Still Battery No. 1.
23. South side machine shop.

And so forth. (If there are no alarm boxes, divide plant into zones and describe zones here.)

6. Water pumper start fire pump.

The pumper at the cooling tower pump house is to start the fire pump at once and build it up to full speed.

7. All users of water get off the fire lines.

Everyone who is using water out of the fire hydrants must shut off these hydrants at once and disconnect all hose.

FIRE BRIGADE REPORT TO FIRE

8. Fire chief take command.

Operating assistant superintendent; or night superintendent; or ranking operating foreman on duty.

Fire chief will go directly to the fire and take command. He will first get in touch with the foreman of the department on fire, for advice on local conditions of stills, tanks, piping, etc. He will then direct the marshal.

9. Fire marshal direct crews.

Fire inspector; or master mechanic; or night repair foreman.

Fire marshal will first get general orders from fire chief. He will then direct the crews to hydrants as they arrive, and give orders to crew captains.

10. Operating foreman remain on duty.

His crew will turn on fire steam or foamite, start pumping out, etc., and will then report to the fire chief upon his arrival and take all orders from him.

11. Hose crews report to fire.

CRUDE STILL HOSE CREW

Captain, first shift; second shift; third shift; outside helper.

Nozzleman, first shift; second shift; third shift; topman.

Nozzleman, first shift; second shift; third shift; first fireman.

Hoseman, first shift; second shift; third shift; plater up.

Hoseman, first shift; second shift; third shift; plater up.

Hydrantman, first shift; second shift; third shift; second fireman.

This crew will answer all fire alarms, except for fires in the crude stills, when they will remain on operating duty. This crew will take cart from hose cart house No. 2 west of the crude stills to all fires except in the north tank farm. This crew will run without equipment to all fires in the north tank farm, and will take hose from the hydrant house nearest the fire.

LUBE OIL HOSE CREW

(Assign operating positions and work out instructions for this and other crews in a similar manner.)

Mechanical Crew.

Captain—Pipe fitter foreman. pipe fitter; pipe fitter helper; shift electrician.

This crew will answer all fire alarms. They will get necessary tools and report directly to the fire.

First Aid Crew.

First aid man; crew captain; two crew men.

The first aid man will report to the fire. He will leave one man in the first aid station. The first aid man shall make all calls to the outside for doctors, ambulances, etc. No one else shall call doctors or ambulances unless first aid man is not available, when watchman at main gate shall make these calls.

The first aid crew shall go directly to the fire and report to the fire chief for orders.

12. Watchman report to outside.

The watchman at the main gate will call the superintendent, assistant superintendent, etc., who are off duty, in order according to the list posted in the watchman's office.

Watchman at night will call Rock Island Engine, when it is not in the yard:

Bell phone Main 41, night yardmaster or his clerk.

Bell phone East 295-M, superintendent's clerk in case you cannot get yardmaster.

No strangers will be allowed to enter the plant.

Watchman will keep record of all employes entering and leaving the plant to fight fires.

13. Other employes off duty at night come to plant.

Operating employes who hear the fire whistle at night shall come at once to the plant, and report to the fire chief, or marshal.

14. All other operating men to remain on duty.

All operating men not on hose crews remain on duty, prepared to operate or shut down their units, as directed by the fire chief.

FULTON DUPLEX
SENSITIVE VACUUM REGULATOR

On a system discharging gases to a line, under light vacuum, it is sometimes desirable to maintain atmospheric pressure.

For this purpose, we manufacture the DUPLEX VACUUM REGULATOR, which acts as a safeguard when used on the vapor lines connected to storage tanks, for the recovery of the gases, the purpose being to prevent the pulling of a vacuum.

WRITE US FOR FURTHER INFORMATION

CHAPLIN-FULTON MFG. CO.

28-36 Penn Ave., Pittsburgh, Pa.

They didn't take a chance

Vogt Stills were ordered

SPECIFICATION

Size — 10' dia. x 60' long

Plate Thickness — 7/8", 1" and 1 1/8"

Rivets — 1 1/4" swelled neck

Operating Conditions — 100 lb. @ 800° F.

Test Pressure — 225 pounds

Shipping Weight — 107,500 pounds

Low carbon open hearth still-bottom steel.

Edges of all plates machined on plate planer — not bevel sheared.

Circumferential joints assembled by expansion and contraction method.

Rivet holes drilled from solid plates after assembly.

Seams electrically welded inside and outside — instead of calked.

THE men responsible for the purchase of equipment at this large eastern refinery knew that they could not afford to buy other than the best. They realized that destruction of property and loss of life frequently result from apparently slight defects in such high pressure and high temperature stills.

They also realized that every so-called boiler shop is not competent to build stills — that special equipment and an organization trained up to that high grade workmanship (see specification) is necessary to produce stills that will not require frequent and expensive repairs to keep them tight. This is another reason why they ordered Vogt Stills.

And they didn't take a chance upon costly delays in their construction program due to failure of the manufacturer to complete the stills as required. They were confident, when they signed the contract, that the stills would be completed as specified. Their confidence was not misplaced. The promised shipment was anticipated almost three weeks.

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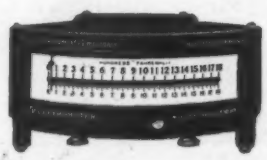

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WRITE FOR OIL CATALOG NO. 1700

Taylor Instrument Companies

ROCHESTER, N. Y., U. S. A.

CANADIAN PLANT, TYCOS BLDG., TORONTO

THERE IS A TYCOS OR TAYLOR TEMPERATURE INSTRUMENT FOR EVERY PURPOSE

15. Fire chief turn in general alarm.

If the fire gets beyond control of regular fire brigade, chief will then turn in general alarm by pulling alarm box or calling power house, the same as for first alarm.

16. Boiler house sound general alarm.

Blow six blasts of the siren, and repeat three times.

17. Watchman call city fire department.

When general alarm is sounded watchman will immediately call city fire department and any men off duty who can be reached by phone.

18. All employes not on operating duty report to fire chief.

All employes not actually operating stills, etc., will report to the fire chief.

Employes who fail to report to plant at fire alarm will be asked to explain to the superintendent why they did not come.

At night a first alarm will be considered the same as a general alarm, and all employes must report or explain why.

19. Fire chief shut down operating units as necessary.

The fire chief will order stills, agitators, etc., to be shut down as he finds necessary to protect property or secure additional men for fire fighting.

The acting fire chief is in supreme command of the entire plant during time of fire, and all his orders must be obeyed.

The fire chief will leave at least one man at each unit he shuts down—for safety.

20. Operators to remain at posts of duty.

The following operators shall remain at their posts of duty in any emergency as long as it is safely possible for them to do so:

Boiler house, water tender; power house, turbine tender; cooling tower pump house, pumper; main gate, watchman.

21. Fire chief order recall.

When the fire is under control, so that no more help is needed, chief will order power house to sound recall.

22. Power house sound recall.

Blow one long blast of siren. All men not already at fire on duty or arrived at plant will turn back.

23. Fire chief remain on duty until fire out.

The fire chief will remain on duty after the recall is sounded until the fire is entirely out. He will then turn the fire apparatus over to the fire marshal who will see to putting it away.

24. Fire chief shut off fire pump.

The fire pump shall not be shut off at sound of recall, and not until ordered off by fire chief.

25. General rules for fighting fires.

Obey the Fire Chief

Fire crews obey your captains.

Crew captains report at once to the fire marshal.

Upon arrival at the fire get your apparatus strung out in readiness, but do not turn on any water until ordered to do so by the fire marshal.

Do not turn water on hot tar lines or hot brickwork.

Do not turn water on live wires or of any electrical apparatus.

For electrical fires use only small one-quart hand pump fire extinguishers. These contain carbon tetrachloride which is an insulator. All others conduct electricity, and are dangerous to the operator.

Protect surrounding property from catching fire, even more vigorously than you try to put out the fire already caught. Watch out for oxygen and acetylene cylinders and oil drums near the fire, and get them out or keep them cool with water, at all costs.

Relieve nozzlemen and hosemen from duty by changing often, especially when cold, wet, exposed to fire heat, or in other difficult positions.

Relieve operating men from fire duty as soon as possible, replace with laborers, and send the operators back to their work.

26. Fire chief make written report.

Immediately after the fire the fire chief will make a full written report of all details to the superintendent.

Refining Progress Belies Waste Charge

(Continued from page 11)

complished a possible saving of 25 per cent in gasoline content of crude oil, but it also is bent on accomplishing still greater eonomies through research and the adoption of methods that will serve economic ends.

If the leaders of the petroleum industry do decide to hold themselves up as not guilty of "waste," no better evidence can be found than the progress of refining.

Out of the Air

The natural gasoline part of refining is in its whole content a monument to the economic efforts of men of the petroleum industry. It had its beginning almost by accident. Before that there was "waste" because there was ignorance.

That is true today. Undoubtedly there is "waste" in the production of crude oil. But men are striving every day by methods and mechanical methods to overcome it. That they adopt methods, once they are proven, is shown by the trend of refining.

Another fact is that "waste" is no more flagrant in the oil industry than it is in any other industry engaged in the development of a natural resource. Still no board exists for determining more economical methods of cutting down trees and converting them into lumber.

The whole petroleum industry has a lot to say in its own behalf when it comes to the charge of "waste." What its refining division has accomplished is the loudest word it has.

How Stabilizer Effects Large Saving

(Continued from page 25)

able specifications and at the same time assures the maximum possible yield of that material from the natural gas used.

"Owing to the simplicity of the activated carbon process, there are certain conditions under which it can operate to show better profits than the other types of natural gasoline plants, even where the stabilizer is added to assure perfect recovery. In these cases, however, the operation of the activated carbon process, too, is improved by the use of the gasoline stabilizing process and is justified on any save the smallest and on the intermittent activated carbon plants.

"In particular where low pressure gas is consumed nearby as in some public service installations, carbon black plants and the like, the activated carbon process has a great advantage since no compression equipment is required, or if the low pressure oil absorption process is used for comparison, the handling of large oil volumes is avoided.

"Furthermore, where large volumes of very lean gas are to be treated with a yield of 250 gallons per million cubic feet of gas treated, or even less, the activated carbon process has the advantage of an operating cost proportional to the gasoline removed, rather than to the volume treated, and accordingly, can best be used. Naturally, however, where the yield is so low, a small increment in gallons per million makes a large difference and particularly in such installations the effect of a perfectly sharp curve cut between the marketable gasoline constituents and the propane, such as the stabilizer gives, is very important.

"Again the small plant, producing 1000 gallons of gasoline per day, or less, can much better use the activated carbon process on account of its smaller investment and lower operating costs. In such plants and in others perhaps even smaller that may be operated only intermittently, the small earnings make any additional investment impossible. Where the aggregate production of a number of such small plants is considerable, however, an overwild product may well be collected and sent by pipe or by rail to a certain point for stabilizing."

In the East as in the Mid-Continent field the installation of the natural gasoline stabilizing process has been accomplished in several districts. The Tidal Refining Company now has five plants actually installed and Chestnut & Smith Corporation have two plants operating with the use of the process with others contracted for. The Noble Oil & Gas Company has an installation under contract as has the Lewis Gas Products Company in Kansas. In the East the South Penn Oil Company has an installation under way at the company's Pinch, West Virginia, plant.

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STYLE 300

Metallic wearing face. Resilient asbestos channel. Flexible and compressible. Cut with a knife. Easy to install. Makes almost a frictionless bearing for your rods that—

RUNS COOL

With "JOHN CRANE" refiners are able to hold low rod temperatures required for volatile oil products. One company ordered two sets for trial and followed it in a few weeks with an order for 48 sets. A long efficient packing service proven in refineries and natural gas manufacturing plants. Made in 12 ft. spirals, sizes 3/8" to 1¼"—also made in rings.

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W. H. Steigerwald Co., 617 Washington Ave., Houston, Texas

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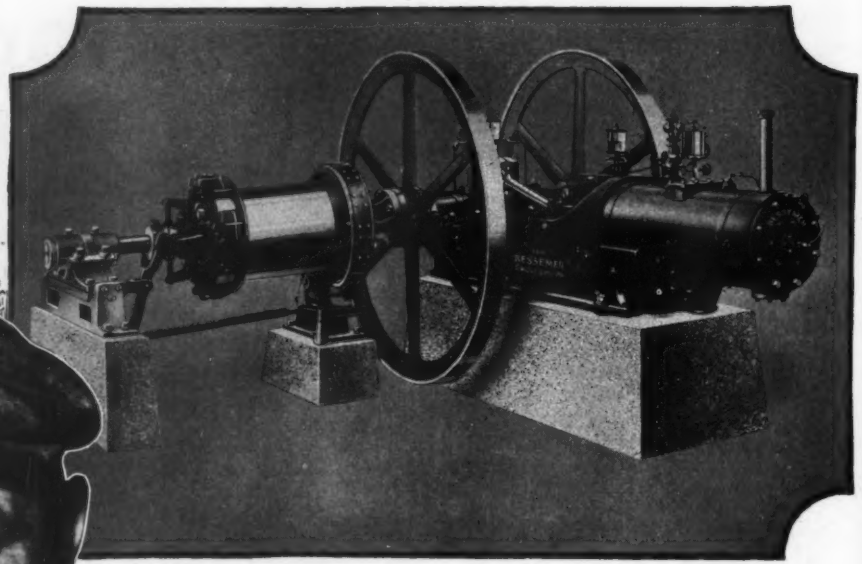

"Nearest Fool-Proof"—

IN describing his Bessemers, the chief engineer of a Texas plant, experienced with all kinds of engines, stated that Bessemers are "the nearest fool-proof of any engines I have ever seen."

Their simplicity and sturdiness permit a degree of continuous, trouble-free service impossible to obtain with other equipment.

The longer running time, the lower upkeep cost of Bessemers will pay you added profits on *your* leases and give you the same fool-proof, year after year service they are giving thousands of other users in all of the country's oil fields.

Write for complete information covering the equipment you require.

Oil Field Engines
8 to 15 H. P.

Commercial Gas Engines
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Oil Engines
Semi-Diesel 25 to 180 H. P.
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BESSEMER

BESSEMER OIL FIELD ENGINES — COMPRESSORS VACUUM PUMPS — ROLLER PUMPING POWERS

Tell them where you saw the ad

RECENT REFINERY PATENTS ISSUED

BY STAFF REPRESENTATIVE

Washington, D. C.—The following patents of interest to the refinery industry were granted during the month of January by the United States patent office:

No. 1,521,601, granted January 6 to Max F. DeBajligethy, Houston, Texas, for an oil cracking still including a boiler, a dome upstanding therefrom and whose upper end is closed, a flue within said dome secured at its upper end to the closed end of the dome and whose upper end is provided with an inlet and whose lower end extends down into said boiler, a pipe within the boiler, normally submerged in the fluid therein, into which the lower end of the flue connects, said pipe leading outside of the boiler, a plurality of baffles between said flue and dome and heat radiating members carried by the periphery of the dome.

No. 1,522,425, granted January 6 to Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Company, Chicago, for a continuous process of oil conversion, consisting of passing a body of oil in a restricted stream through a continuous elongated passageway where said oil receives its cracking heat, in transferring the highly heated oil while in a substantially liquid condition to an enlarged chamber where vaporization of a portion of the oil occurs in discharging all unvaporized oil from said chamber without permitting the same to again enter said elongated passageway, in discharging vapors from said chamber to a reflux condenser, in passing charging stock to said reflux condenser to aid in the condensation of the insufficiently cracked vapors passing therethrough and to preheat the charging stock, in discharging uncondensed vapors from the reflux condenser, in removing condensate and charging stock from the reflux condenser, and in introducing the same together with an independent supply of charging stock to the inlet side of said elongated continuous passageway to travel therethrough, and in maintaining a superatmospheric pressure on the oil undergoing conversion.

No. 1,522,480, granted January 13 to Robert C. Allen, Lakewood, Ohio, assignor to Henry L. Doherty & Co., New York, for a process for recovering vapors or gases from from an admixture thereof with other gases, which consists in passing the mixture of gases to be treated transversely through a moving column of material capable of adsorbing such vapors or gases.

No. 1,522,985, granted January 13 to George A. Taff, Colorado Springs, Colo., for an apparatus for extracting hydrocarbon constituents from oil shale or other minerals, comprising a heating chamber, a sealed retort having separated upper and lower muffle portions extending through said chamber and end portions communicating with said muffles exterior of said chamber, conveyer drive elements mounted in said end portions, one of said end portions including longitudinally adjustable plates supporting one of said conveyer drive elements, an endless agitating conveyor running over said elements and through said muffles, means exterior of the retort for adjusting said plates to adjust the tension of the conveyor, means for delivering the finely crushed oil shale or other mineral to one end of one of said muffles, a discharge passage for the residue communicating with the same end of the other muffle, and means for conducting the volatile constituents of the oil shale or other mineral from the retort.

No. 1,523,053, granted January 13 to Ulysses F. Clemons, Marshall, Okla., for an apparatus for refining crude petroleum and hydrocarbon oils, including an oil tank, heating means for the tank, a dome for the tank of large diameter and height relative to the tank and having opposed sides which extend considerably below the top of the tank, a foraminous floor for the dome arranged so that the space between the floor and the surface of the oil in the tank is of the same depth as the space between the surface of the oil and the top of the tank, a bed of Fuller's earth on the floor, an outlet at the top of the dome, a pan in the dome in spaced relation to and beneath the floor so as to catch any particles of the earth dropping from the dome, and means to connect said pan to the tank whereby to afford spaces between the margin of the pan and the top of the tank to permit the vapors to enter the dome.

No. 1,523,077, granted January 13 to Thomas M. Melott, Shawnee, Okla., for a process of treating oil for the mechanical separation of its impurities which comprises supplying the impure oil continuously to a container, conducting said oil from the bottom of the container to a heating coil, heating said coil to a temperature lower than that sufficient to form gas, conducting the heated oil back to the top of the tank for direct mixture with the incoming impure oil, drawing off the purified oil from the top of the container, and drawing off the impurities from the lower portion of the tank, the whole as a continuous process.

No. 1,523,219, granted January 13 to Walter H. Kaul, Mexia, Texas, for a method of treating crude oil which comprises bringing the crude oil into intimate contact with molasses; and separating the oil from the remaining parts of the mixture prior to distillation.

No. 1,523,220, granted January 13 to Walter H. Kaul, West Columbia, Texas, for a method of treating "roily" oil to dehydrate and purify the same, which consists in introducing into said oil a reagent comprising a heavy viscous organic liquid having a relatively high affinity for water and a cresolic substance; and permitting the mixture to stand, whereby the impurities may separate from the oil.

No. 1,523,131, granted January 13 to Harold E. Thompson, Clendenin, W. Va., assignor to Carbide and Carbon Chemicals Corporation of New York, for a process of making gasoline of predetermined vapor pressure from natural gas, which comprises treating the gas with an active solid absorbent in such manner that the major portion of the butane and substantially all of the less volatile hydrocarbons are absorbed, liberating the absorbed material from the absorbent, and rectifying it to produce a vaporous and a liquid fraction in such manner that said vaporous fraction and said liquid fraction do not contain a substantial quantity of more than one hydrocarbon individual in common.

No. 1,523,314, granted January 13 to Harold E. Thompson, Clendenin, W. Va., assignor to Carbide and Carbon Chemicals Corporation of New York, for a new product, propane-free natural gas gasoline containing upward of 25 per cent of butane, and for a new product, natural gas gasoline containing upward of 40 per cent of butane and free from more volatile hydrocarbons.

No. 1,523,497, granted January 20 to Herschel G. Smith, Swarthmore, Pa., assignor to the Atlantic Refining Company, Philadelphia, for an apparatus for producing a sharply defined fraction of petroleum, comprising a still, a dephlegmating tower, deflector members spaced vertically from each other in said tower and having their peripheries in liquid-tight contact with said tower, said deflector members extending downwardly and inwardly to openings, packing material in said tower vertically continuous through said openings, a condenser, a vapor line extending from said tower above said packing to said condenser, and means for returning from the outlet of said condenser to said tower above said packing condensate discharged by said condenser.

No. 1,523,547, granted January 20 to Thomas La Vora, Iowa City, Iowa, for a gasoline filtering compound consisting of a mixture of 75 per cent of sodium hydroxide, 17½ per cent of sodium sulphate, 4 per cent of sodium carbonate, 1½ per cent of sodium chloride, and a small amount of water.

No. 1,523,942, granted January 20 to George Frederick Forwood, London, Eng., assignor to United Kingdom Oil Company, Ltd., London, for a process of treating hydrocarbon-containing

They Tried 4 Kinds

Then Standardized on Foxboro

Foxboro Orifice Meter.

Ranges 0-20 in., 0-60 in., 0-100 in., differential. All static ranges from full vacuum to 1000 lbs. pressure. For use with casinghead gas, natural gas, still vapors, steam, air, oil and water.

"Of four different kinds of orifice meters which we have used in our field work, we have found the Foxboro to be the most satisfactory in every respect—both as to accuracy and convenience in handling."

LOUISVILLE GAS AND ELECTRIC COMPANY

"We use Foxboro thermometers principally on our Crude Stills, temperature reaching the maximum of about 780 degrees. While the instruments are in operation, we have found them consistently correct, and of great assistance in our refining process. In fact, we have found it impossible to get the best results without temperature control ———."

SUN COMPANY

Foxboro Temperature Recorder-Controller

Ranges from—25 to +1000°F. For automatic control plus a permanent record of temperature in stills, knock-out boxes, condensers, wax heaters, storage tanks, etc.

These letters serve to point out to those who have not yet become familiar with Foxboro Orifice Meter performance that much time, trouble and expense may be saved by standardizing on Foxboro instruments at the outset.

Bulletin RN 113-1 explains why, in detail. May we send you a copy?

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116

Wilson-Snyder

Hot Oil Pumps

Over 72 Cracking Stills are now equipped with Wilson-Snyder Hot Oil Pumps circulating oil at 800 degrees temperature.

WILSON-SNYDER

PITTSBURGH, PA. **U. S. A.**

shale, consisting of a heating retort, filled with shale, to about 400 degrees C. at the upper part and to about 600 degrees C. at the lower part, conveying steam to the interior of the retort, passing the oil distilled from the shale at the upper portion of the retort together with the steam downwardly through the partially spent shale to crack said oil and then through the spent shale at the lower part of the retort to decompose the steam by means of the carbon in the spent shale and thereby produce hydrogen, using said hydrogen to hydrogenate the unsaturated bodies contained in the shale oil, and drawing away the products from the lower end of the retort.

Gasoline Men Will Hold More Operator Meetings

Tulsa, Okla.—According to A. V. Bourque, Secretary of the Association of Natural Gasoline Manufacturers, a meeting of plant operators will be held in the Burbank field as soon as the weather moderates.

On account of the success of the meetings held last year, many invitations have been received from all parts of the oil country for a meeting to be held. The Wichita Falls-Burburnett district is particularly interested in having another meeting held in the near future.

The success of the plant operators discussion during the annual meeting of the Association of Gasoline Manufacturers which was held in this city last April was the incentive for the meeting which were later held in different fields in Oklahoma and Texas. At these meetings the plant operators discuss the different troubles found around the gasoline plants and join in a discussion of a remedy for such difficulties.

At a meeting held in Drumright, Oklahoma, last year more than two hundred operators were present.

Will Use Electric Power In Burkburnett Gas Plant

Burkburnett, Texas.—Electric motors are being installed by Noble Oil and Gas Company to replace gas engines for power in operating its compression natural gasoline plant in the Burkburnett field, owing to the scarcity of residue gas. A 250 h. p. motor will be used on the compressor units, while 100 h. p. motors will drive the vacuum pumps. This plant is making use of only a small portion of its built capacity as result of the depletion of gas in the Burkburnett field. It was built during the early days of the Burkburnett field, and at one time ranked among the largest natural gasoline plants in the world.

It is better to regret not having installed any cracking process than to repent having installed the wrong one

But best of all is the joyful feeling of the refiners who have installed the Dubbs Cracking Process

It is Universal in its use of all hydrocarbon oils, and it is now Universal in its use throughout the world

Universal Oil Products Company
Owners of the Dubbs Process
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Repair Department Under Supervision of Skilled Factory Trained Workmen—

Hays Analyzers **Draft Gauges**
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Rebuilt and put in first class working condition.
Prompt service and fair prices.

We do the Work

Complete Line of Laboratory Supplies and Oil Testing Instruments
Everything in the way of scientific material to meet the requirements of a modern Refinery.

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228 East Fourth Street

TULSA, - - - OKLAHOMA

METERS

For refinery processes and all other work where accurate measurement of oil is essential.

The EMPIRE

A positive displacement meter operated by an oscillating piston.

This design, which gives the EMPIRE its unsurpassed accuracy, is entirely different from that of any other type of oil meter.

The EMPIRE is made in all sizes, from ⅝″ to 6″ and for oils in a wide range of pressures and temperatures.

We will be glad to send you a circular fully illustrating the construction of the EMPIRE, and showing just why it is the closest registering and longest lasting of all oil meters.

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NATIONAL METER COMPANY

299 BROADWAY, NEW YORK

BRANCHES IN ALL PRINCIPAL CITIES

Tell them where you saw the ad

Texas Natural Gasoline Output Shows Increase Despite Adverse Conditions

Fort Worth, Texas.—Natural gasoline shipments from plants in North and Central West Texas during the year 1924 amounted to 212,906,568 gallons, or a gain of 27,061,020 gallons when compared to shipments made during the previous year. The steady growth of the natural gasoline manufacturing industry in Texas since the introduction of the first plants in the Burburnett and Ranger districts has resulted in production increasing every year for a new record, and has placed the state among the foremost in the country as a source of supply for this commodity.

An average of 17,671,751 gallons of natural gasoline were shipped from Texas plants each month during 1924, while the monthly average for 1923 amounted to 15,487,129 gallons. The record for monthly shipments during 1924 was established in August when 19,754,700 gallons of natural gasoline were dispatched via tank cars to various parts of the country.

During the first six months of 1924, a total of 105,088,536 gallons of gasoline were marketed, while the last half of the year amounted to 107,818,032 gallons. This gain of 2,729,496 gallons made during the last half of 1924 over the previous six months period fell short in maintaining the percentage of gain that has been made in shipments in recent years, and is largely due to low prices and absence of new gas supply. The long period of low crude prices during 1924 checked drilling operations in the fields that produce gas suitable for plant operation, with the result that plant expansion work was almost at a standstill, and many of the plants suffered heavy losses in gas due to the natural depletion of old wells, with no new gas production coming in to offset the decline. The Burkburnett district experienced a sharp decline in natural gasoline production due to gas production dropping rapidly, along with its heavy slump in crude output. Eastland, Stephens, Shackelford and Young Counties registered gains in natural gasoline shipments during 1924, but the small volume of new gas production made available during 1924 served to retard plant growth in these counties.

The passing of the year 1924 has brought forth a period of most favorable prices for both natural gasoline and crude, and the new development work that will follow the rise of the crude market will also react to the advantage of the natural gasoline industry by reason of more gas being made available for plants now in operation. Manufacturers of natural gasoline are now scouting the fields for additional gas contracts for their present plants, as well as seeking locations in prospective areas that will justify the erection of new plants.

Chestnut & Smith Corporation, Phillips Petroleum Company and Humble Oil & Refining Company are putting forth the most effort to build up their natural gasoline production in Texas to higher levels, and these three concerns have been buying plants heretofore operated by small companies in order to enlarge their natural gasoline production. Humble is building new plants in the South Vernon field, Wilbarger County, and at Wortham, and recently purchased two operating plants in Stephens County for a cash consideration of $1,125,000 from the Hope Engineering & Supply Company. The two plants purchased by Humble from Hope were operated under the name of Westova Oil & Gas Company, and are manufacturing about 30,000 gallons daily, with a potential daily production of 50,000 gallons.

The Phillips Petroleum Company purchased the largest plant in Texas last November when it acquired the Landreth plant in the Ibex field, Shackelford County, and recently purchased two plants operated near Breckenridge, Stephens County, by the National Products Company. It is reported that one of these National plants may be closed down, and the gas diverted to a nearby plant acquired last year by Phillips from the National Gasoline Company. Since the purchase of the Landreth plant, Phillips has bought up most of the producing properties in the Ibex field, thereby giving full control of the gas production.

A comparison of shipments of natural gasoline in barrels of 42 gallons from various manufacturing centers in Texas during 1923 and 1924 follows:

Fields—	1923 Barrels	1924 Barrels
Eastland County	1,981,669	2,287,524
Stephens County	1,126,337	1,458,411
Burkburnett	922,446	667,503
Electra	190,855	225,436
Shackelford County	47,900	221,805
Young County	86,446	130,208
Petrolia-Clay County	68,066	55,905
Brown County	1,175	13,967
Potter County	.....	8,445
Totals in Barrels	4,424,894	5,069,204

Three Skimming Plants and Gasoline Plant in New Mexico

Albuquerque, New Mexico.—Three small crude skimming plants and a single unit natural gasoline manufacturing plant will be in operation in New Mexico when the spring and early summer motoring season arrives this year. The West Coast Gasoline Company has recently placed in operation a 50-barrel daily capacity skimming plant at Aztec to run on high gravity crude produced in a shallow field in San Juan County, while this company is also operating a small natural gasoline manufacturing plant on gas produced near the town of Aztec. The crude is delivered to the skimming plant in trucks.

The Continental (Mutual) Oil Company is erecting a refinery at Farmington to handle approximately 500 barrels of crude daily, and will supply its retail and distributing stations in the northwest part of the state from this plant. Continental has production on the Rattlesnake dome section of the Navajo Indian reservation, San Juan County, and has entered into an agreement whereby its pipe line from Rattlesnake dome will tie in with the small carrier Mid-West Refining Company recently completed to transport its crude from the Hogback field to Farmington. Welded joints are necessary on the pipe line furnishing crude for Continental's plant, as the crude tests above 60 gravity. The First State Refining Company has completed a 500-barrel capacity topping plant at Roswell to operate on crude recently made available in the Artesia field, located in the southeastern part of the state. The crude will be piped from the field to a tank car loading rack on the Santa Fe railroad, and delivered in cars to the Roswell plant.

Omaha Refining Company Plant Leased to Cross

Omaha, Neb.—The E. T. Williams Oil Company of Casper, Wyoming, has leased its plant, known as the Omaha Refining Company, in East Omaha, to the Henry H. Cross Company of Chicago. The refinery has a rated capacity of 1500 barrels.

Australia Refinery

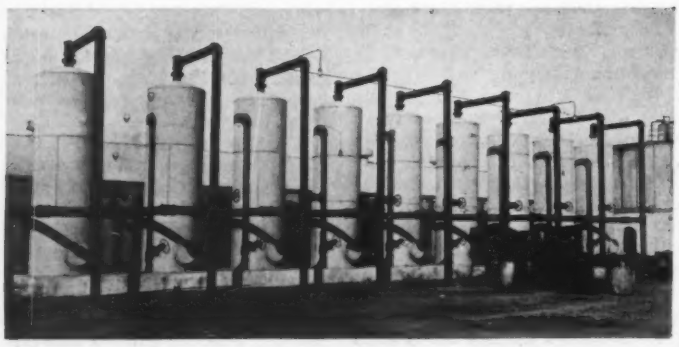
London, Eng.—The Commonwealth Oil Refineries, Limited, is engaged in fitting up a modern refinery west of Newport, Victoria, in Australia. Crude oil for the plant is to be imported into the country.

Humble Oil Company Buys North Texas Gasoline Plants

Breckenridge, Texas.—Two natural gasoline manufacturing plants erected by the Hope Engineering & Supply Company in Stephens County and operated under the name of Westova Oil & Gas Company were purchased early in February by the Humble Oil & Refining Company for a cash consideration of $1,125,000. Both of these plants are comparatively new, one having been placed in operation about two months ago, and are making about 30,000 gallons of gasoline daily. The daily gasoline production of these two plants will be increased to about 50,000 gallons when the new plant begins operating at capacity.

Absorption gasoline recovery system is used in both plants. The first plant operated in Stephens County by the Westova Company was built by the Hope Company on the A. J. Dunlap land, section 1411, T. E. & L. Co. survey, in the Atlantic field, with a daily capacity of about 15 million cubic feet of gas. The other plant is located on the W. A. Sweeney land, section 1, T. & P. Ry survey, block 5, in the North Caddo field, and will handle about 20 million cubic feet of gas when all equipment is placed in operation. Both plants have an ample supply of gas on contract, and these contracts have been delivered to Humble, as well as miscellaneous physical properties such as tank cars, loading rack, gas lines, etc.

The sale of these two plants marks the withdrawal of the Hope Engineering & Supply Company from the gasoline manufacturing field in Texas, but the company will continue to design and manufacture equipment and gasoline recovery systems along with its contracting service on erecting various kinds of plants and pipe line carriers. Headquarters are located at Mt. Vernon, Ohio.



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Dallas, Texas

French Law Would Increase Development of Petroleum

Paris, France.—In line with the new governmental policy of exploiting French resources in France a law has been promulgated having in view the development of crude oil areas and refining the raw product within the country.

It is believed that this law will be the means of promoting increased activity in oil refining construction work in the republic in the future.

Indian Refining Company Plant Being Improved

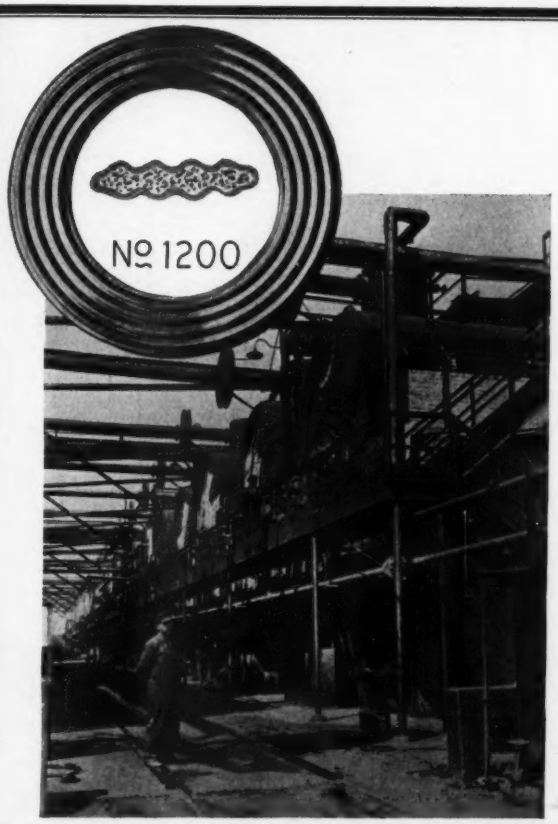
Lawrenceville, Ill. — Improvements are being made at the plant here of the Indian Refining Company which is equipped with cracking process. The plant has a rated capacity of 17,500 barrels daily. The company operates on western Kentucky crude.

Montana Refining Plant to Resume After Receivership

Great Falls, Montana.—The American Refining Company with a refinery here, is being reorganized under the name of the Great Falls Refining Company. The present plant was purchased at a bankruptcy sale recently for $15,000 and was awarded to C. W. Hay.

500-Barrel Plant Begins Operation in New Mexico

Roswell, New Mexico.—The First State Refining Company has completed a 500 barrel daily capacity skimming plant as Roswell in the southeast part of the state, and will start operating in February on crude contracted for in the Artesia field, New Mexico. This crude will be delivered to the plant in tank cars via the Santa Fe railroad. The skimming plant represents an investment of approximately $50,000, and will manufacture gasoline, kerosene, distillate and fuel oil. The officers of the company are: J. B. Gilliland, president; Grover Ellis, vice president; Chas. H. Houston, vice president; and Bruce Sullivan, secretary-treasurer and general manager. L. C. Bivens will be plant superintendent.



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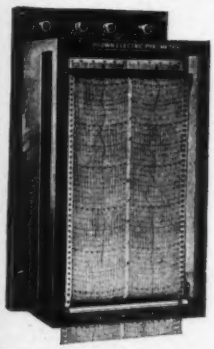
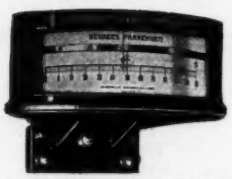


Brown Duplex Continuous Recording Pyrometers for all high temperatures. New Catalog No. 14.

Brown Long Distance Recording Thermometers for temperatures below 800° F. Catalog No. 63.



Brown Resistance Thermometer (indicating and recording types) for temperatures from minus 300° F., to plus 300° F. Catalog No. 91

Brown Recording Pressure Gauges—for all pressures and vacuums. New catalog No. 73.

Brown Pyrometers and Thermometers are also made in Automatic Control types—both Indicating and Recording. These instruments, because of their flexibility and simplicity are successfully meeting the automatic temperature control problems of the modern oil refinery. Catalog No. 86.

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Temperature, Pressure, Co_2, Speeds

Brown Instruments

Sherwin-Williams Open Tulsa Office

Cleveland, Ohio.—H. D. Whittlesey, vice president and managing director of sales of the Sherwin-Williams Company, Cleveland, announces the appointment of H. R. Hefley, manager of the Petroleum Industry Sales Department.

Mr. Hefley will have his headquarters at Tulsa, Oklahoma, and will operate throughout the Mid-Continent field, working particularly in the Southwestern Mississippi Valley and Texas districts.

For the past several years Mr. Hefley has been manager of the Oklahoma sales division of the Sherwin-Williams Company. A. W. Everett, formerly assistant sales manager of the Oklahoma division, has been appointed sales manager to succeed Mr. Hefley.

Silica Gel Plant

Baltimore, Md.—The Royal Dutch-Shell interests have formally accepted the silica gel commercial plant installed at the company's refinery at New Orleans by the Davison Chemical Company of Baltimore. This was the first large oil refinery equipped with the silica gel process.

A syndicate of German companies headed by the Borsig interests and the upper Silesian Coke Works have contracted with the Davison Chemical Company for the use of the silica gel process in their various manufacturing enterprises, particularly in the output of benzol.

Reeder in California

Charles Reeder, Sales Manager Oil Equipment Division of the A. Y. McDonald Manufacturing Company, Dubuque, Iowa, was in Houston about the middle of February on his way to California where hs is now calling on the California trade.

Charlie had his entire bag of tricks with him consisting of everything from the disappearing nickel to the non-burning cigarette. When you see him ask him to show you this train.

Shanklin Resigns

Richard M. Shanklin of Philadelphia, vice president of the Crew-Levick Company and associated with the Doherty interests for 32 years, has resigned and has been succeeded by A. H. Irelan who will maintain headquarters in Philadelphia.

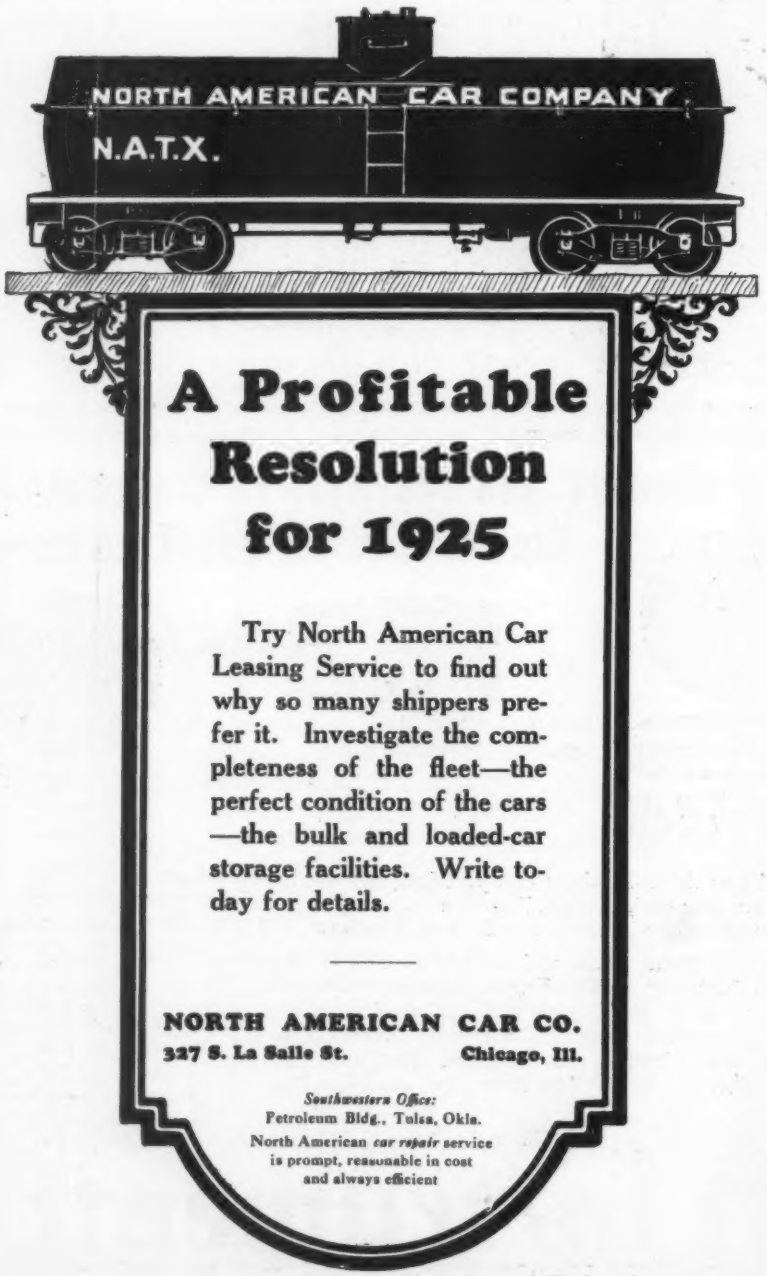
H. H. James of Tulsa, who has been connected with the Sherwin-Williams Company in the Tulsa, Oklahoma, territory has resigned his position and now is associated with the E. I. du-Pont de Nemours Company.

Re-Organized Company Takes Over Constantin Refineries

Tulsa, Okla.—The Constant Refining Company with principal offices here, has been formed to take over the reorganized properties of the Constantin Refining Company and Constantin Oil & Gas Company. The new corporation is headed by Pat M. Malloy, general counsel for the Constantin companies prior to receivership and receiver after that time.

Officials of the new company include Albert V. Foster of Toledo and New York, a member of the firm of Spitzer-Rorick and Company, who will be vice president, and J. C. Easton of New York, also connected with the Spitzer-Rorick interests, who will be secretary and treasurer. Offices of the company will be maintained at 705 Kennedy building in Tulsa.

The directorate of the new company is made up of members of the bond holders committee. The Constant Refining Company owns two refineries, one at West Tulsa and the other at Devol, Oklahoma, both well equipped and modern in construction. It is the purpose of the new company to recondition these plants and make extensions and improvements where necessary. The West Tulsa refinery has a rated capacity of 4000 barrels daily and that of the Devol plant 8000 barrels daily.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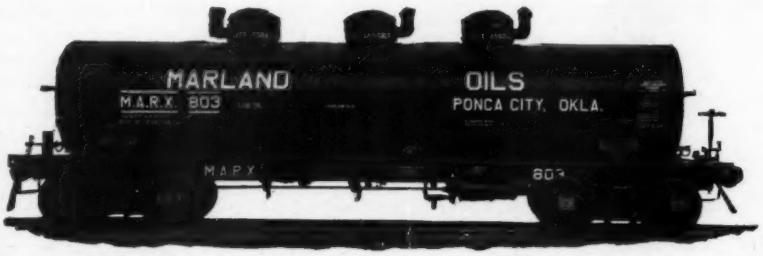

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3-compartment lubricating oil tank car equipped with independent heating coils.

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The car shown above is made with three compartments, each of approximately 2,700 gallons capacity. Independent heating coils make it possible to deliver the contents of each section separately. So three stations can be served from one car. Or three different types of lubricating oils can be shipped at one time in one car. We have a number of these cars on hand for immediate delivery—*sale or lease.*

The tremendous expansion of the good roads program for 1925 has prompted the General American to provide a better, more efficient tank car for the shipment of asphalt and heavy road oils. These new cars are equipped with one-piece, welded coils and jacketed outlet valves. Two new departures of great importance. The welded coils prevent any possible leakage of steam—always a danger in the past—and the combination of welded coils and jacketed outlet valves makes for quick and safe unloading. We have built more than 100 of these cars for immediate delivery *on lease or for sale.* Place your reservations early.

G.A.T.X. is constantly improving and bettering their equipment, to meet the requirements of tank car users.

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Clean Tubes for Cracking Still Efficiency

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Powerful

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Wiggins Floating Roof Is Past Experimental Stage

Chicago, Ill., Feb. 19.—The Chicago Bridge and Iron Works announces that the Wiggins Floating Roof can now be offered to the oil industry as a piece of equipment that is no longer an experiment. The many roofs which have been built and placed in service are operating successfully, and evaporation tests have shown that the savings predicted for the roof were underestimated.

The sleet storm which generally covered the United States in December had no detrimental effect upon the roofs in the Northern part of the country, and showed the drainage system used on the roof to be entirely satisfactory.

Waite Phillips Operating Wichita, Kansas, Refinery

Wichita, Kans.—The refinery here of the Waite Phillips Company of Tulsa now is in operation and more than 4000 barrels daily is being run to stills. This is the plant formerly owned by the Sterling Oil & Refining Company and acquired by the Phillips Company last October. The plant is operating on crude from the Rainbow Bend field in Cowley County, Kansas, which is linked with the refinery here by a 4-inch line.

The plant has a rated capacity of 5000 barrels daily and the equipment at the time of purchase included eight Blaisdell stills to be operated either batch or semi-continuous. This method has been changed to the continuous. The plant also is equipped with six Fleming cracking units and four Dubbs units, capable of handling about 3200 barrels of cracking stock daily.

V. R. Oakley, formerly plant superintendent of the Wait Phillips Company at Okmulgee, Oklahoma, is in charge of the Wichita refinery. G. C. Wright is assistant to Mr. Oakley.

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Newkirk, Oklahoma, Refinery Under New Management

Oklahoma City, Okla.—The Pirtle-Pittman refinery at Newkirk, Oklahoma, has been acquired by a group of Ponca City, Oklahoma, oil men who are reorganizing and plan to resume operation at an early date. The new company wil be known as the Newkirk Refining Company. The capacity of the plant is to be increased and other improvements are contemplated. The refinery has a rated capacity of 2000 barrels daily.

Small Plant for Alaska

Seattle, Wash.—A small absorption plant in the Katalla field in Alaska has been constructed by the Chilkat Oil Company. The erection work was under the supervision of B. F. Masten, engineer for the Pacific Gasoline Company.

Refinery for Idaho

Casper, Wyo.—It is understood that a Seattle syndicate contemplates the erection of a refinery at McCammon, Idaho, which is located on the boundary line between Utah and Idaho. The plant which is to be modern in construction, will operate, it is stated, on Montana and Wyoming crude oil.

New Tulsa Offices for Braun

Tulsa, Okla.—Mid-Continent offices of C. F. Braun and Company of Alhambra, California, manufacturing mechanical engineers, now are located in suite 601-602 Kennedy building. The company's business in this territory has necessitated larger quarters.

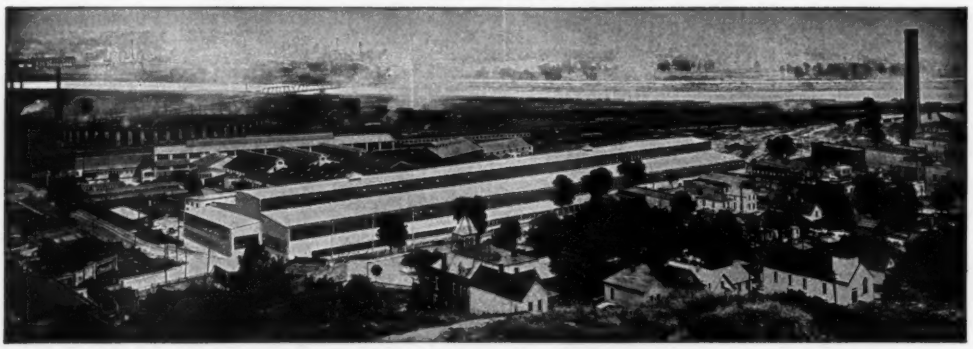
Greenleaf Visits Mid-Continent

D. L. Greenleaf, representative of the Bartlett-Hayward Company of Baltimore, is in the Mid-Continent district for the purpose of furthering the distribution of the mechanical absorber manufactured by his company. The product already is in use in both California and the Mid-Continent, as well as at refineries on the Texas Coast.

Kramer is Promoted

Le Roy Kramer has been appointed vice president in charge of sales and manufacturing of the General American Tank Car Corporation with offices in Chicago.

"WRITE FOR OUR CATALOG"



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This modern, up-to-date plant, backed by a warehouse stock of 10,000 tons and a fabricating capacity of 5,000 tons per month assures prompt delivery to all southwestern points.

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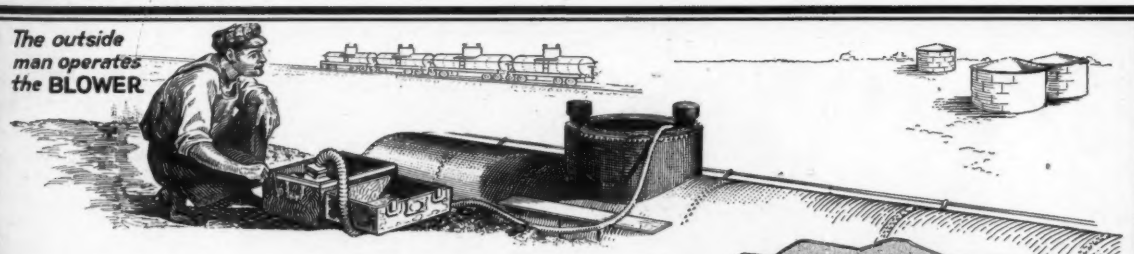

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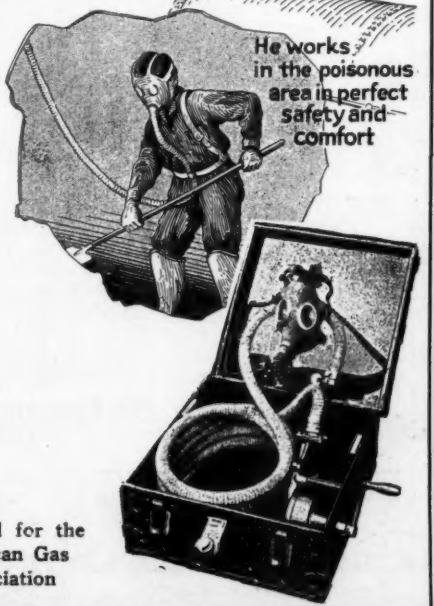
Send for Bulletin No. 99F for complete information on this and other types of Hose Masks



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George F. Brigham Dies At Home in Tulsa, Okla.

Tulsa, Okla.—George F. Brigham, 62 years old, manager of the Southwestern office of the North American Car Company and president of the Commerce Petroleum Company of Tulsa, died at his home here February 8. He was born January 12, 1863, at Fredonia, New York.

Mr. Brigham numbered among his friends and acquaintances many leaders and others in the oil business and was well known not only in the Mid-Continent but in the East and Middle West as well. He was a life member of the St. Louis Railway Club and St. Louis Traffic Club, Missouri Athletic Association, Transportation Club of Chicago, Tulsa Transportation Club and other organizations.

Burial was at Sharon, Wisconsin. Henry H. Brigham, a brother, is president of the North American Car Company with offices in Chicago.

Test Shows Nova Scotia Shale Rich Oil Content

Toronto, Ont.—Results from tests recently made at the Nova Scotia Technical College at Halifax indicate that Nova Scotia oil shale is rich in oil content, yielding upwards of 50 gallons of high grade paraffine to the ton. The report further states that approximately 100 million tons of this shale are accessible, indicating that oil shale refining possibilities of the area are most promising.

Shaffer Plant at Cushing Adding High Pressure Units

Tulsa, Okla.—Work has been started at Cushing, Oklahoma, on the construction of an additional unit of two high pressure stills for the Shaffer Oil & Refining Company's refinery there. The work is being done by the Universal Oil Products Company as the Shaffer plant is equipped with Dubbs cracking process units. The Cushing refinery has a rated capacity of 6000 barrels daily and is a complete plant.

Two Dubbs Units Installed In New Louisville Plant

Louisville, Ky.—Two complete units of the Dubbs cracking process are being installed in the new refinery being built on the Ohio river near here below the Louisville falls by the Louisville Petroleum Refining Corporation.

It is expected that the plant will be in operation in February as most of the material for construction already is on the ground. The plant will have a rated capacity of 1000 barrels daily.

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Purposes, Kinds of Gas, Pressures
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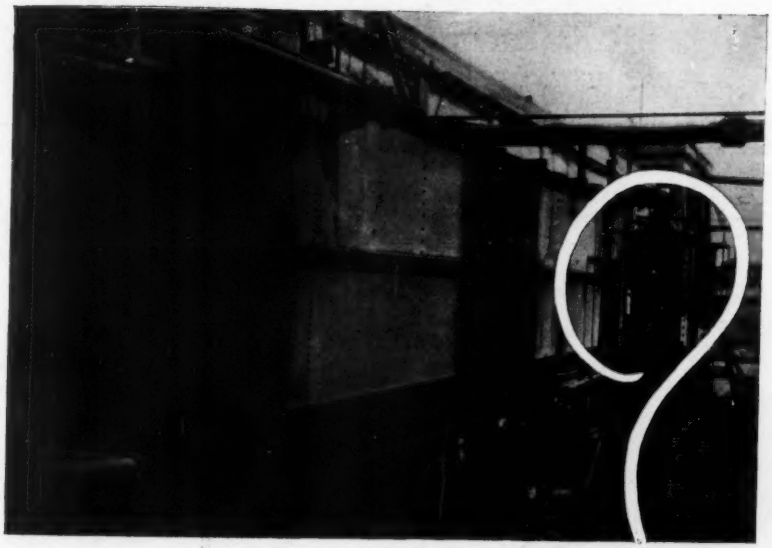

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Soda Ash light 58%.....cwt.	$1.38
Silicate of Soda 60 deg. bbls. . .....cwt.	1.70
Sal Soda wks .....cwt.	1.10–1.25
Caustic Soda 76% .....cwt.	3.10
Chloride of Lime solid .....cwt.	1.90–2.10
Sulphuric Acid 60 deg.tank cars f.o.b. shipping point per ton	9.50–11.00
Benzol—	
90% tank cars	.21
Pure tank cars	.22 .23

When You Choose Your Tankage

Look for the economy of design, the expert workmanship, the servicable construction and the highest grade materials.

"United gas-tight tanks are of right design, right construction and right materials. They are of heavy plate, tight riveted, tight caulked—and guaranteed GAS TIGHT.

Quotations promptly made without obligation to you

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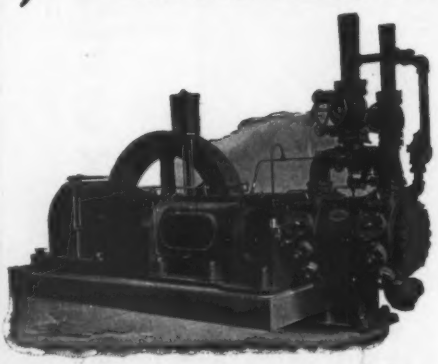
TULSA KANSAS CITY, MO. DALLAS

Vilter **Ammonia Compressors Fittings and Pipe Coils**

Render Years of Reliable Service



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Vegetable Oils—		
*Linseed, carloads, spot	gal.	$1.21
Less carload, spot	gal.	1.24
5 bbls. or less, spot	gal.	1.27
Boiled, tank, spot	gal.	1.17
Boiled, carloads, spot	gal.	1.23
Soya Bean, spot, tank	lb.	.12
Animal Oils—		
English Degras	lb.	.04⅝
Domestic Degras bbls. carloads	lb.	.04¼
Horse	lb.	.09½
Oleic Acids—		
Dist.	lb.	.11½
Saponified	lb.	.11½
Lard Oils—		
Prime		
Winter		
Strained .....1 to 1½ ffa. 40/45c. t.	lb.	.17⅞
Extra		
Winter		
Strained .....2 to 4½ ffa. 40/45c. t.	lb.	.16
Extra...4 to 5 ffa. 40/45c. t.	lb.	.15½
Extra No. 1 .....7 to 10 ffa. 40/45c. t.	lb.	.14¼
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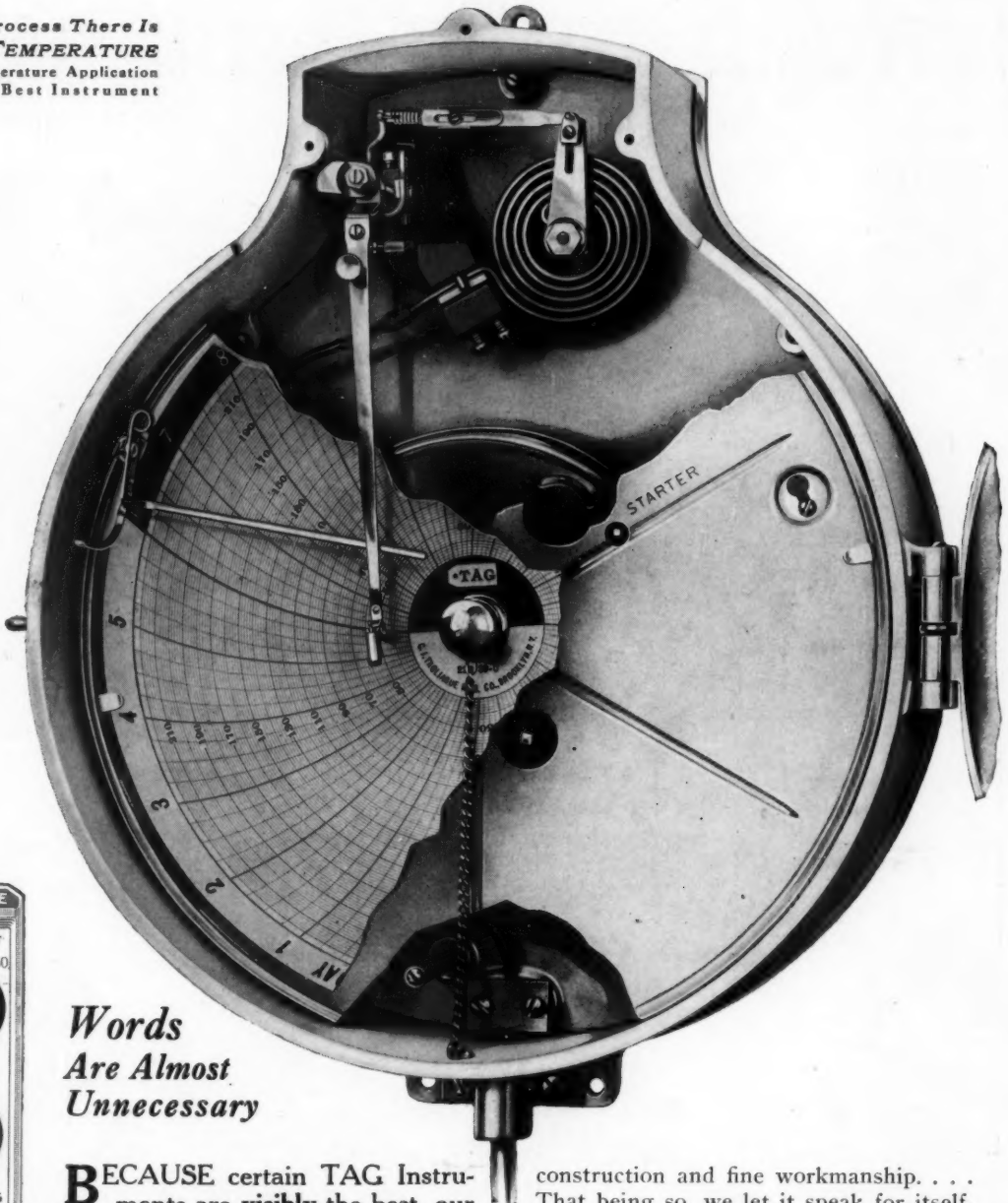
No. 2..22 to 23 ffa. 40/45c. t.	lb.	.13¼
Prime Edible Tallow under 1⅞ ffa. 40/45c. t. N. Y.	lb.	.11
Tallow acidless	lb.	.13½
Lard Stearine	lb.	.19
Oleo Stearine	lb.	.10¾
Neatsfoot Oil—		
Pure	bbls.-lb.	.15½
Extra	bbls.-lb.	.14¼
No. 1	bbls.-lb.	.13¾
Cold Pressed	lb.	.18
Fish Oils—		
Menhaden Oil		
Light pressed	gal.	–.75
White	gal.	–.81
Yellow bleached	gal.	–.78
*Herring, tankcars coast	gal.	–.40
Whale, ext. winter bleached	gal.	–.80
Seal		Nominal
Naval Stores—		
Turpentine, N. Y.	gal.	.94
†Turpentine	gal.	.88
Rosin B., N. Y.	bbl.	8.40
Rosin F., N. Y.	bbl.	8.45
Rosin B.†	bbl.	7.10
Rosin F.†	bbl.	7.10
Rosin Oil 1st run	gal.	.48
Rosin Oil 2nd run	gal.	.51
Pine Tar—		
Kiln Burnt	bbl.	13.50
Retort	bbl.	13.50

*Nominal.
†Savannah, Ga., market.

For Every Process There Is
ONE BEST TEMPERATURE
For Every Temperature Application There Is One Best Instrument



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BECAUSE certain TAG Instruments are **visibly** the best, our sales engineers report that when interviewing technical buyers, they need only let the instrument speak for itself. . . . . Such success has attended the **TAG Mercury Recording Thermometer,** and is due, among other things, to its obviously correct design, scientific construction and fine workmanship. . . . That being so, we let it speak for itself. So much for what can be seen. Now for the quality that you seek above all others; long **accuracy-life.** Endurance tests show that the TAG Recorder has the **longest** accuracy-life. . . . . Cost, therefore, is the lowest per year of satisfactory service. . . . . Write for the evidence.

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SINCE 1769

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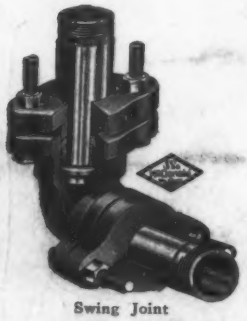

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CURB PUMP SWING JOINTS
CURB PUMP HOSE NOZZLES
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